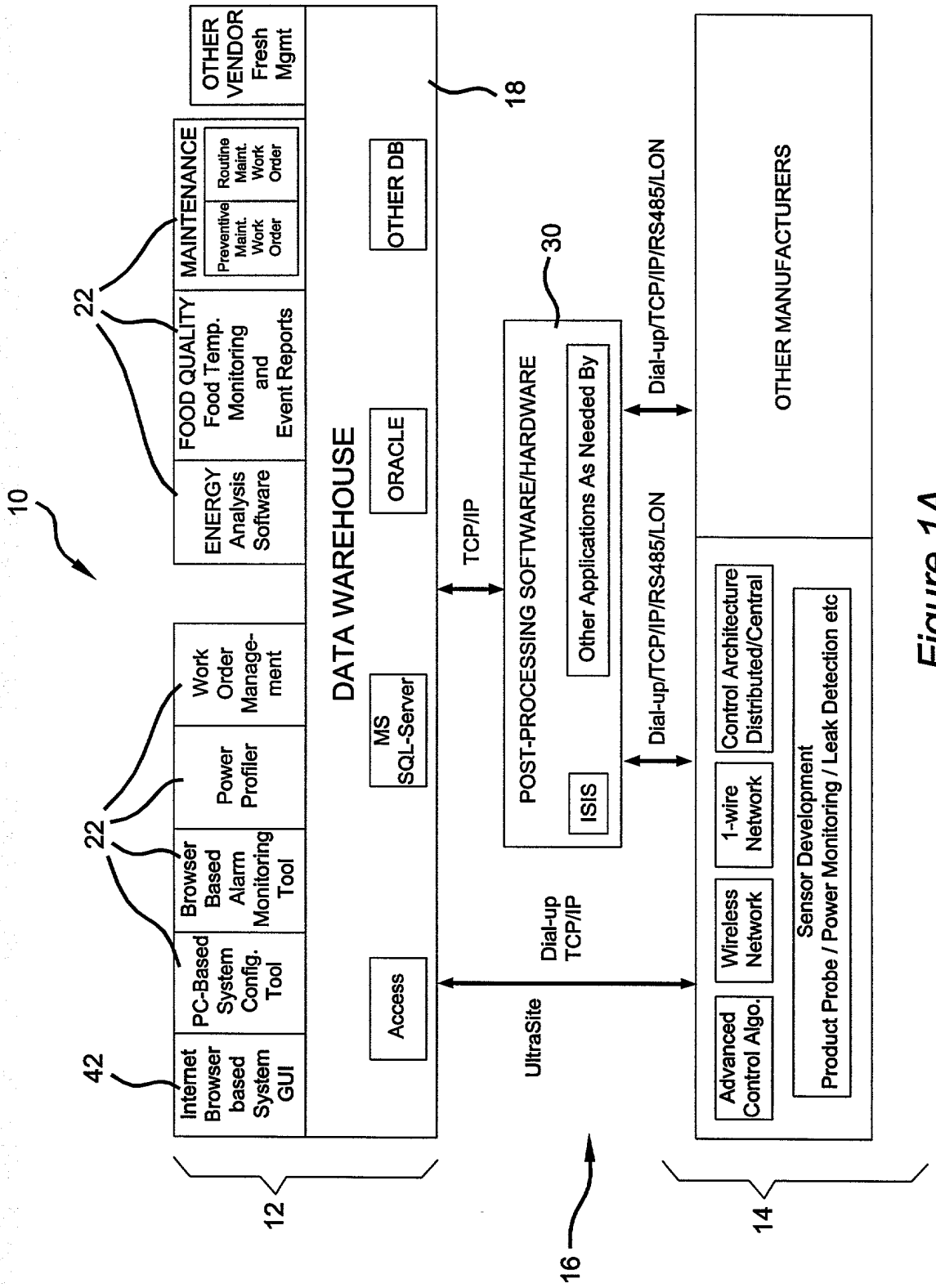

10
42
22
22
12
16
14
18
30
Internet Browser based System GUI
PC-Based System Config. Tool
Browser Based Alarm Monitoring Tool
Power Profiler
Work Order Manage-ment
Access
DATA WAREHOUSE
MS SQL-Server
ORACLE
OTHER DB
ENERGY Analysis Software
FOOD QUALITY Food Temp. Monitoring and Event Reports
MAINTENANCE
Preventive Maint. Work Order
Routine Maint. Work Order
OTHER VENDOR Fresh Mgmt
TCP/IP
UltraSite
Dial-up TCP/IP
POST-PROCESSING SOFTWARE/HARDWARE
ISIS
Other Applications As Needed By
Dial-up/TCP/IP/RS485/LON
Dial-up/TCP/IP/RS485/LON
OTHER MANUFACTURERS
Advanced Control Algo.
Wireless Network
1-wire Network
Control Architecture Distributed/Central
Sensor Development
Product Probe / Power Monitoring / Leak Detection etc

Figure 1A

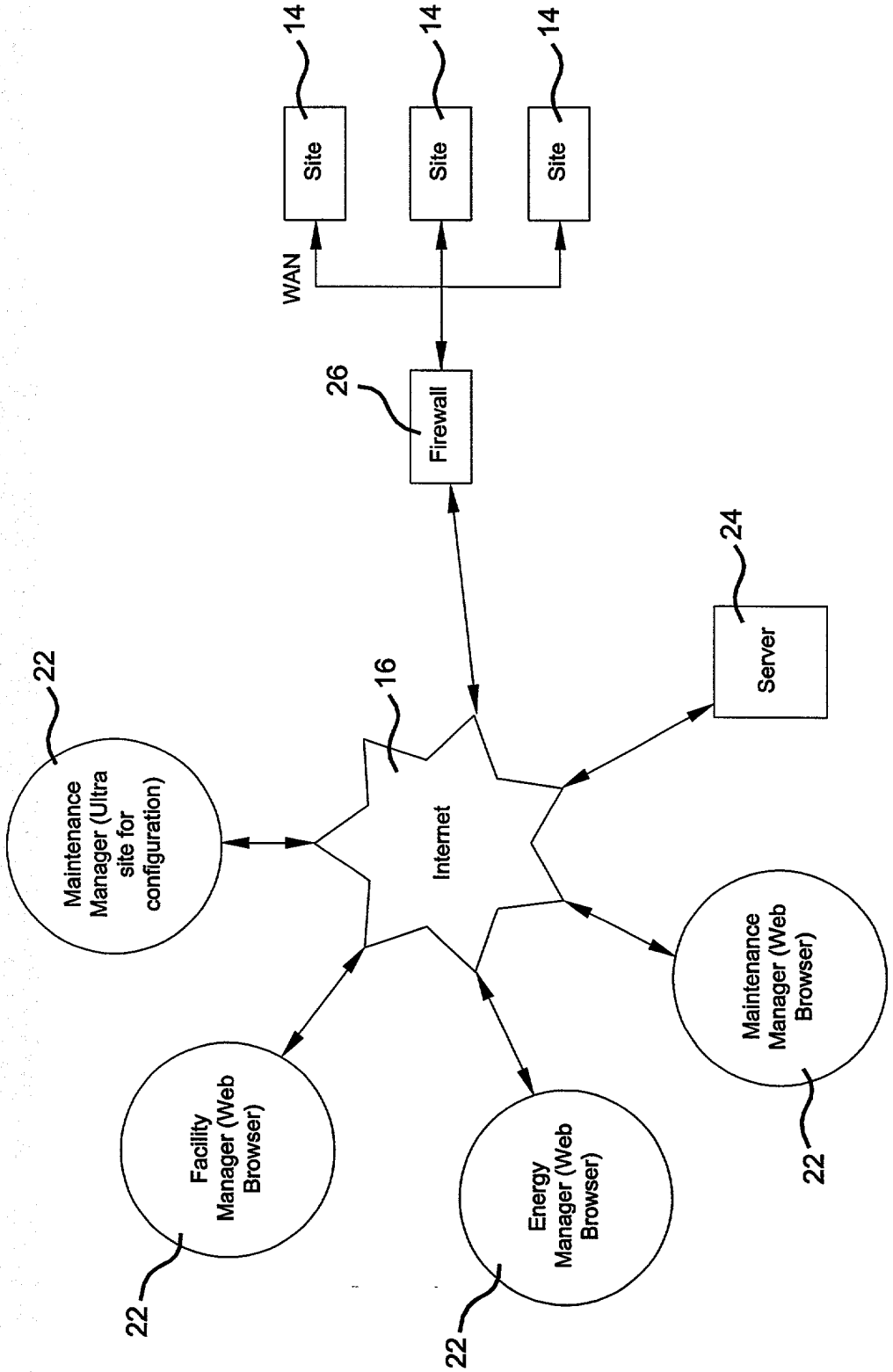

14
Site
14
Site
14
Site
WAN
26
Firewall
24
Server
22
Maintenance Manager (Ultra site for configuration)
16
Internet
Facility Manager (Web Browser)
22
Energy Manager (Web Browser)
22
Maintenance Manager (Web Browser)
22

Figure 1B

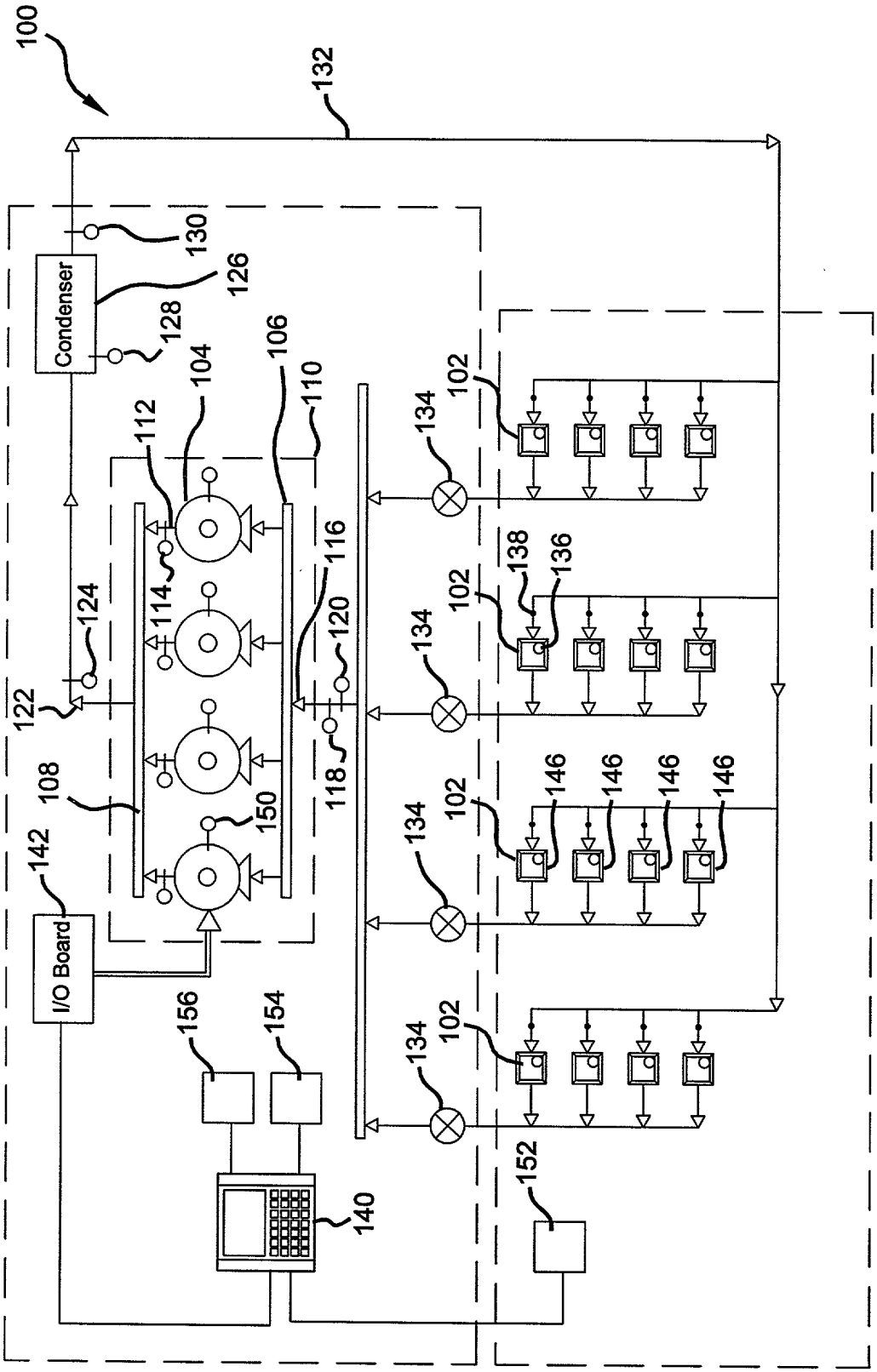

100
132
Condenser
130
126
128
104
106
110
112
114
116
120
124
122
118
108
150
142
I/O Board
156
154
140
152
102
134
138
136
146

Figure 2

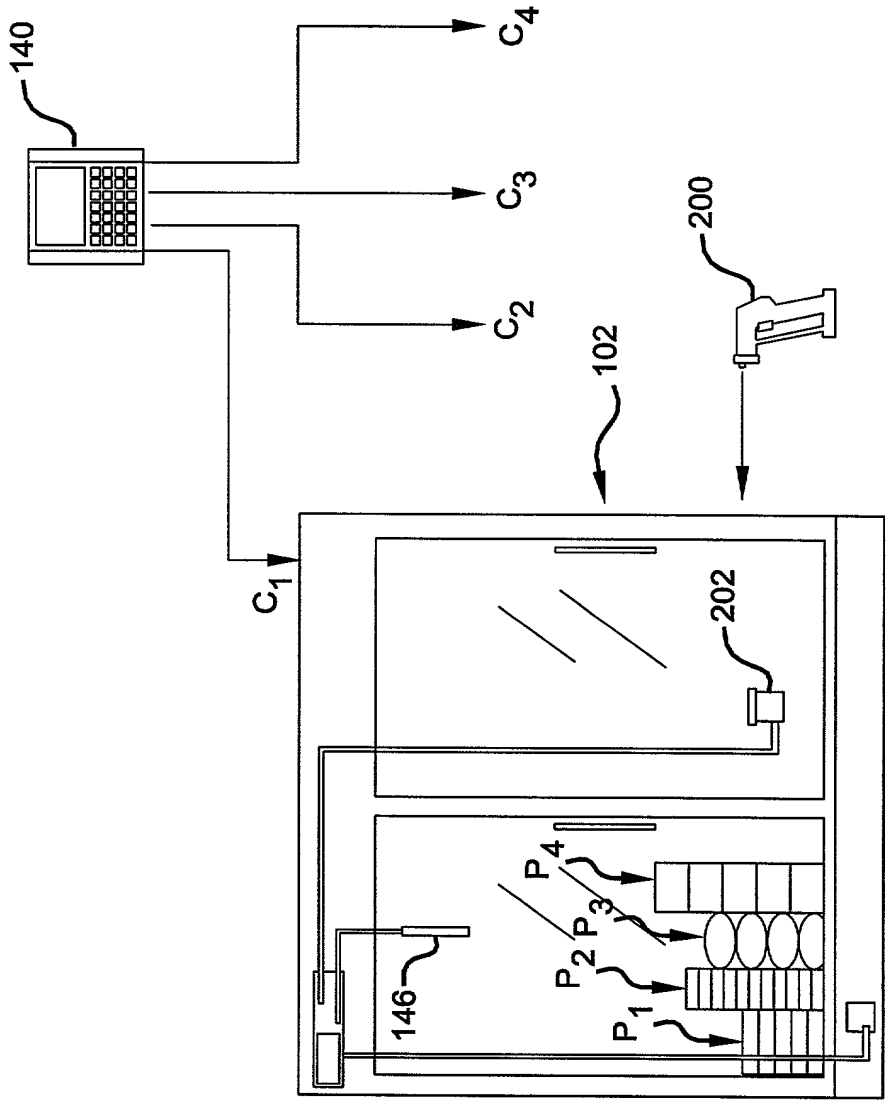


Figure 3

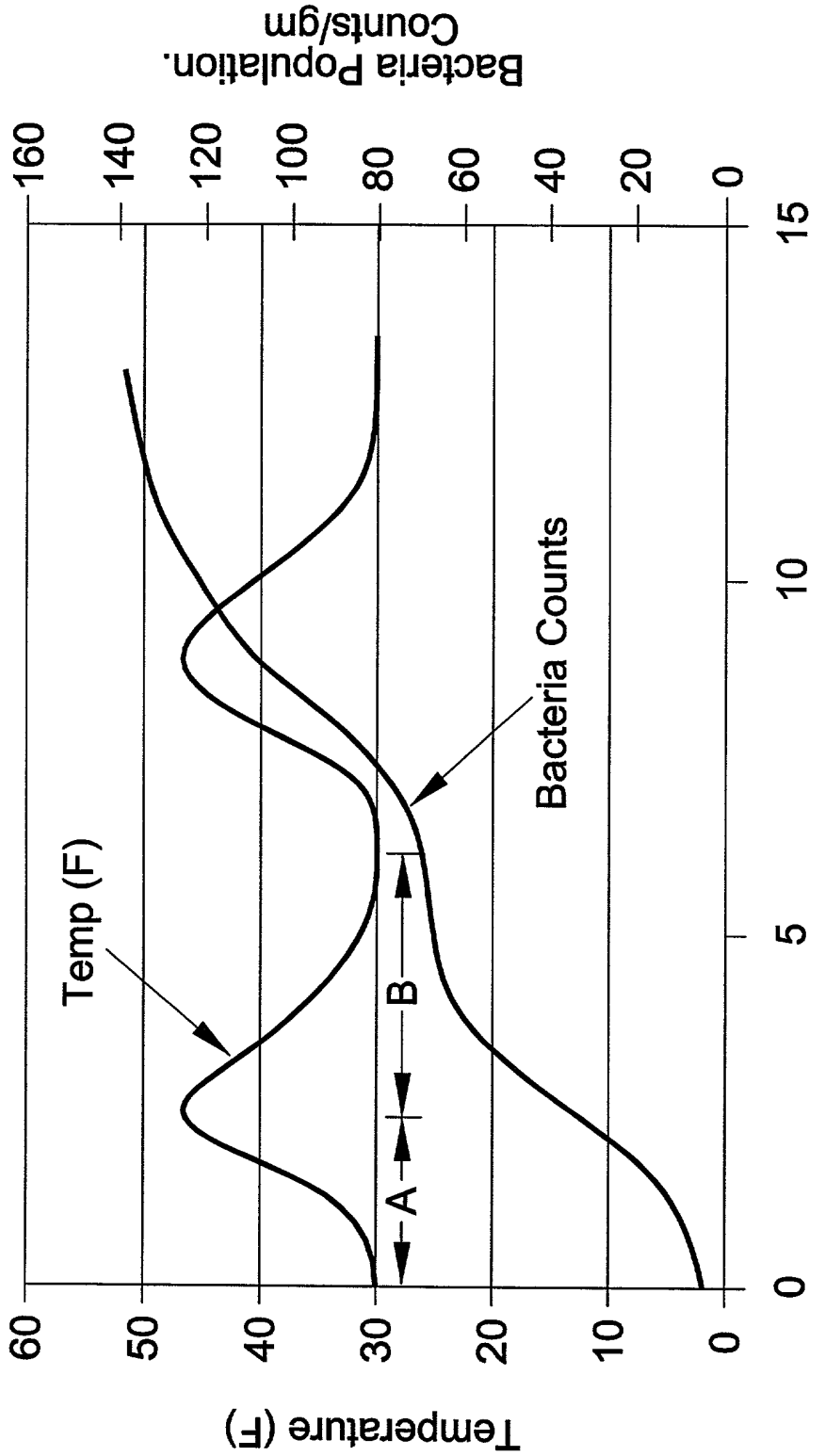

Bacteria Population.
Counts/gm
160
140
120
100
80
60
40
20
0
Temp (F)
Bacteria Counts
A
B
Temperature (F)
60
50
40
30
20
10
0
0
5
10
15
time (hrs)

Figure 4

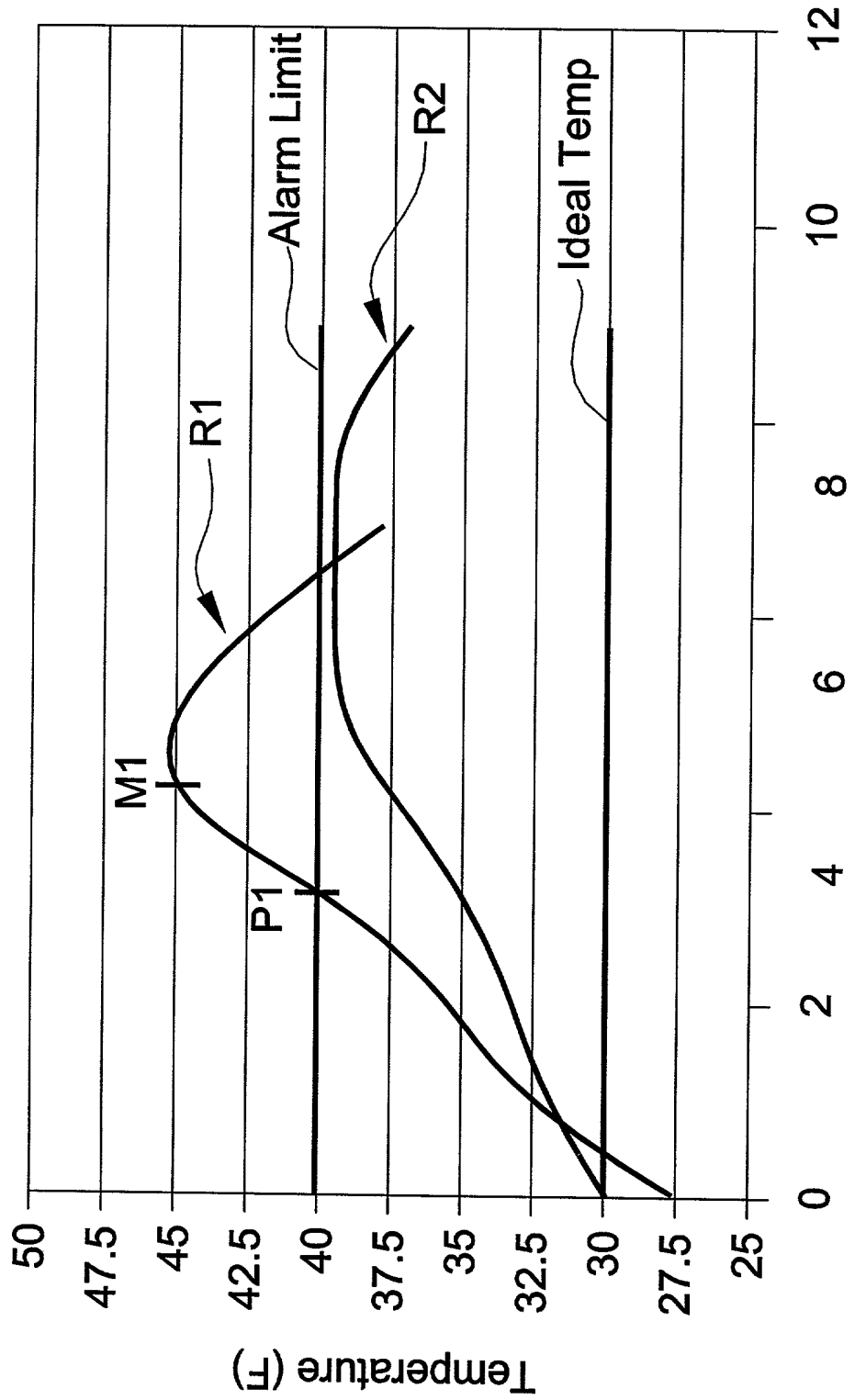

Temperature (F)
50
47.5
45
42.5
40
37.5
35
32.5
30
27.5
25
0
2
4
6
8
10
12
time (hrs)
M1
R1
P1
Alarm Limit
R2
Ideal Temp

Figure 5

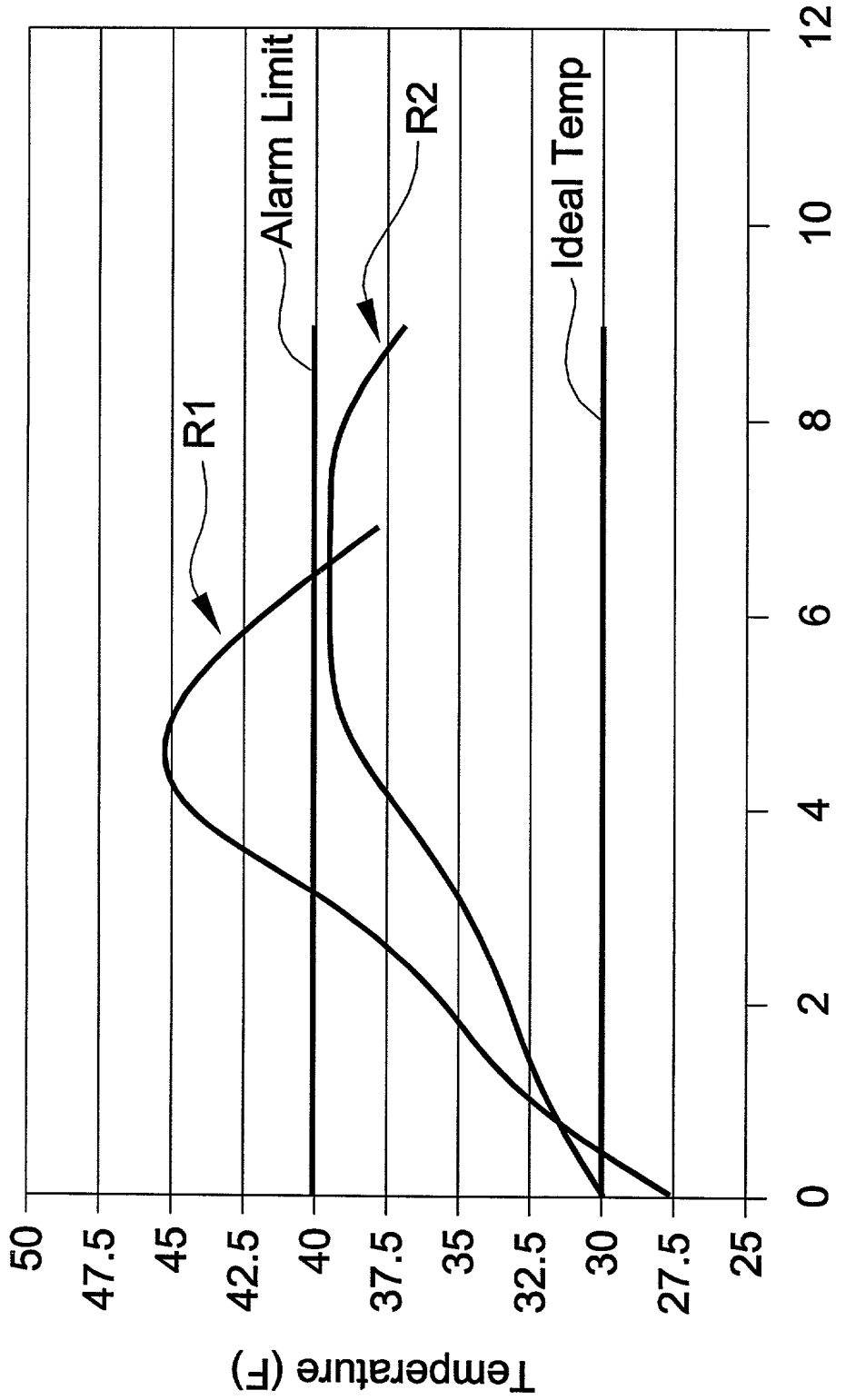

Temperature (F)
50
47.5
45
42.5
40
37.5
35
32.5
30
27.5
25
0
2
4
6
8
10
12
time (hrs)
R1
Alarm Limit
R2
Ideal Temp

Figure 6

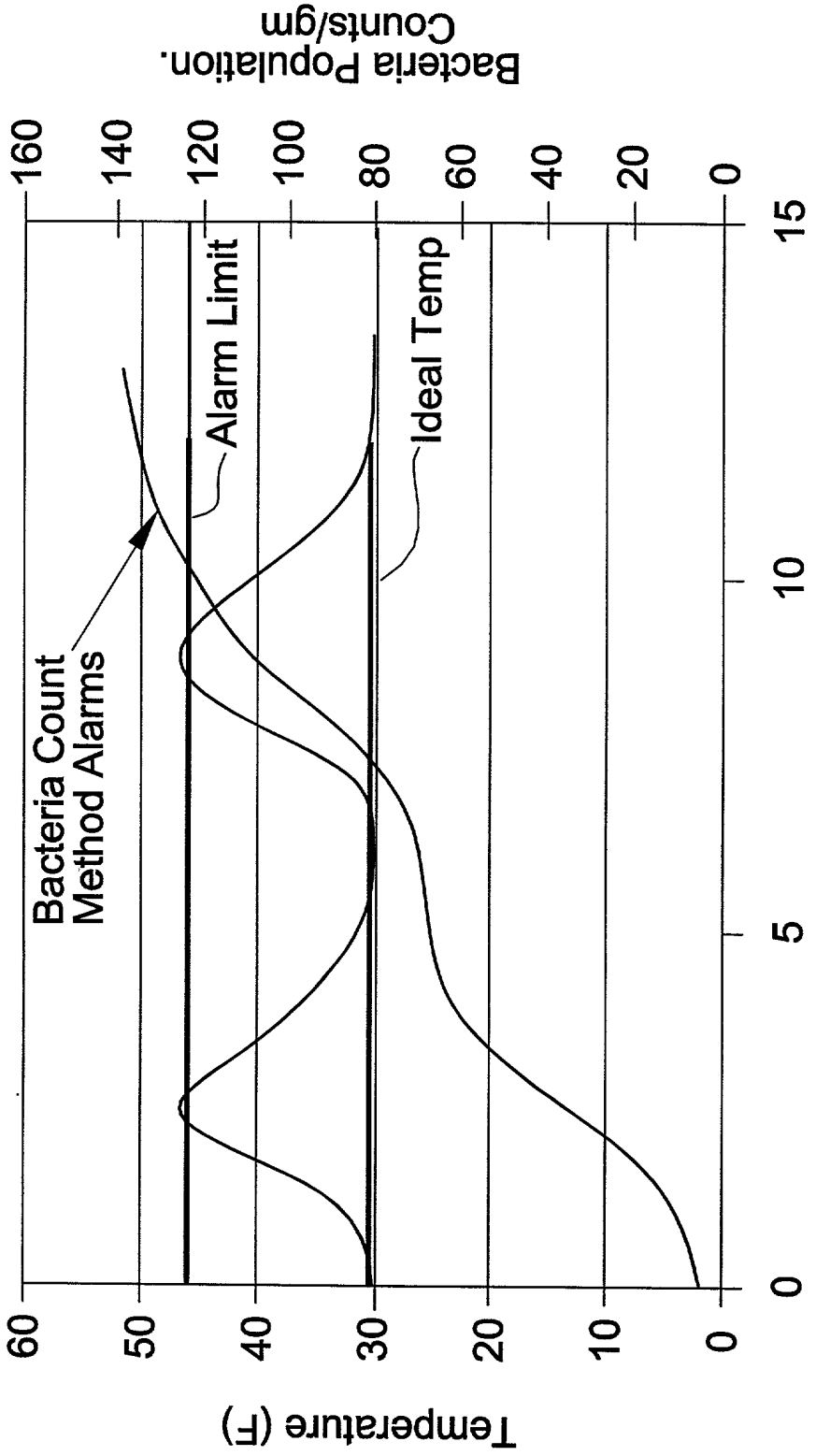

Bacteria Population.
Counts/gm
160
140
120
100
80
60
40
20
0
Alarm Limit
Ideal Temp
Bacteria Count
Method Alarms
Temperature (F)
60
50
40
30
20
10
0
0
5
10
15
time (hrs)

Figure 7

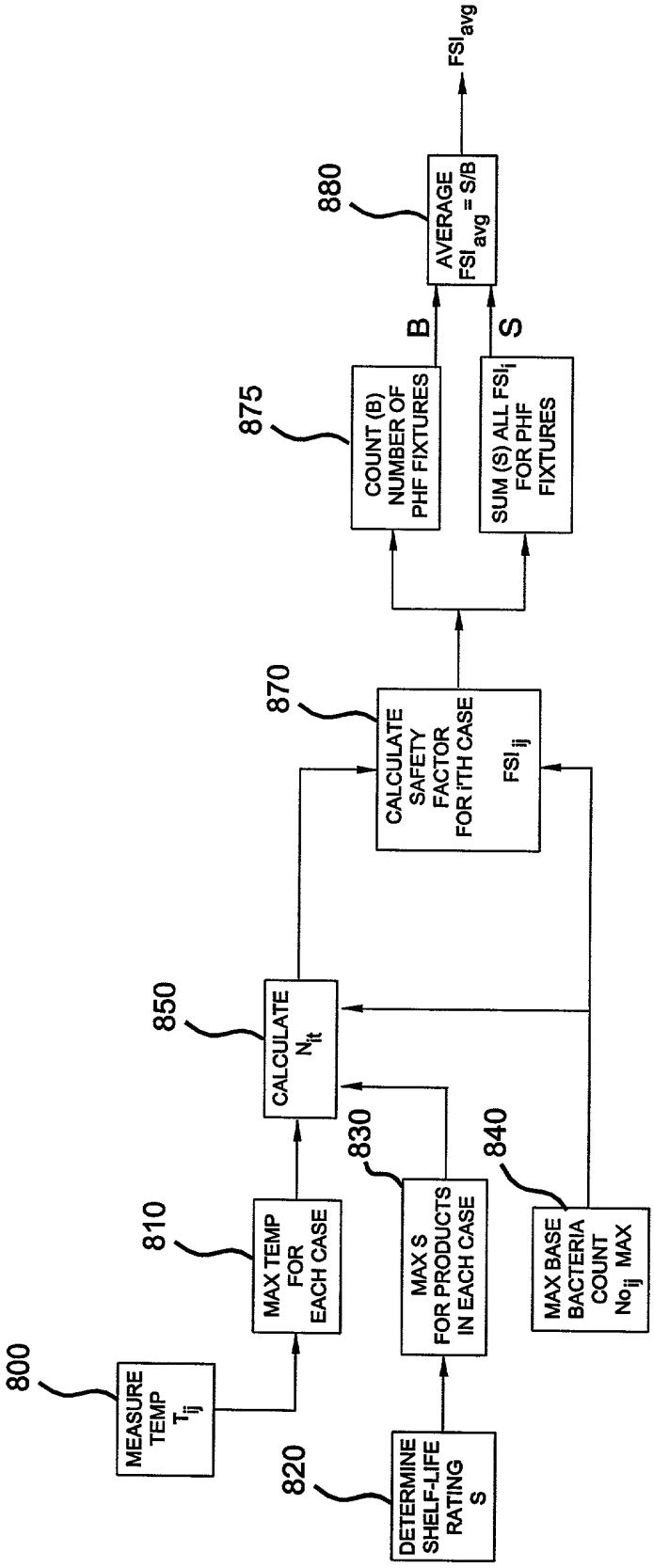

800
MEASURE TEMP T_{ij}
810
MAX TEMP FOR EACH CASE
820
DETERMINE SHELF-LIFE RATING S
830
MAX S FOR PRODUCTS IN EACH CASE
840
MAX BASE BACTERIA COUNT No_{ij} MAX
850
CALCULATE N_{it}
870
CALCULATE SAFETY FACTOR FOR iTH CASE FSI_{ij}
875
COUNT (B) NUMBER OF PHF FIXTURES
SUM (S) ALL FSI_i FOR PHF FIXTURES
B
S
880
AVERAGE FSI_{avg} = S/B
FSI_{avg}

Figure 8

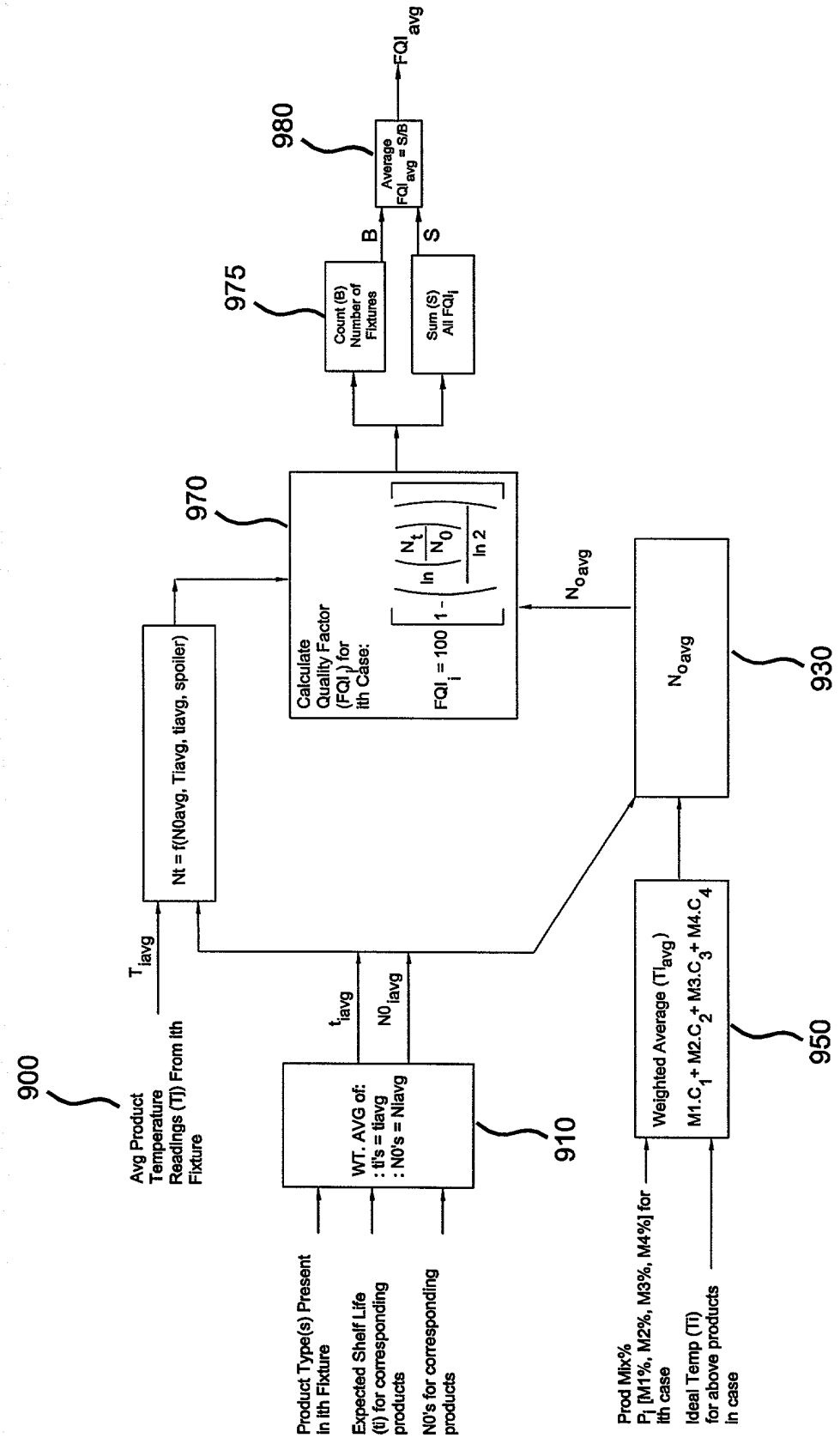

900
Avg Product Temperature Readings (Ti) From ith Fixture
T_{iavg}
Nt = f(N0avg, Tiavg, tiavg, spoiler)
910
WT. AVG of:
: ti's = tiavg
: N0's = Nlavg
t_{iavg}
$N0_{iavg}$
Product Type(s) Present In ith Fixture
Expected Shelf Life (ti) for corresponding products
N0's for corresponding products
970
Calculate Quality Factor (FQI_i) for ith Case:
$FQI_i = 100\left[1 - \frac{\ln\left(\frac{N_t}{N_0}\right)}{\ln 2}\right]$
N_{oavg}
930
N_{oavg}
950
Weighted Average (TI_{avg})
$M1.C_1 + M2.C_2 + M3.C_3 + M4.C_4$
Prod Mix% P_i [M1%, M2%, M3%, M4%] for ith case
Ideal Temp (Ti) for above products In case
975
Count (B) Number of Fixtures
Sum (S) All FQI_i
B
S
980
Average FQI_{avg} = S/B
FQI_{avg}

Figure 9

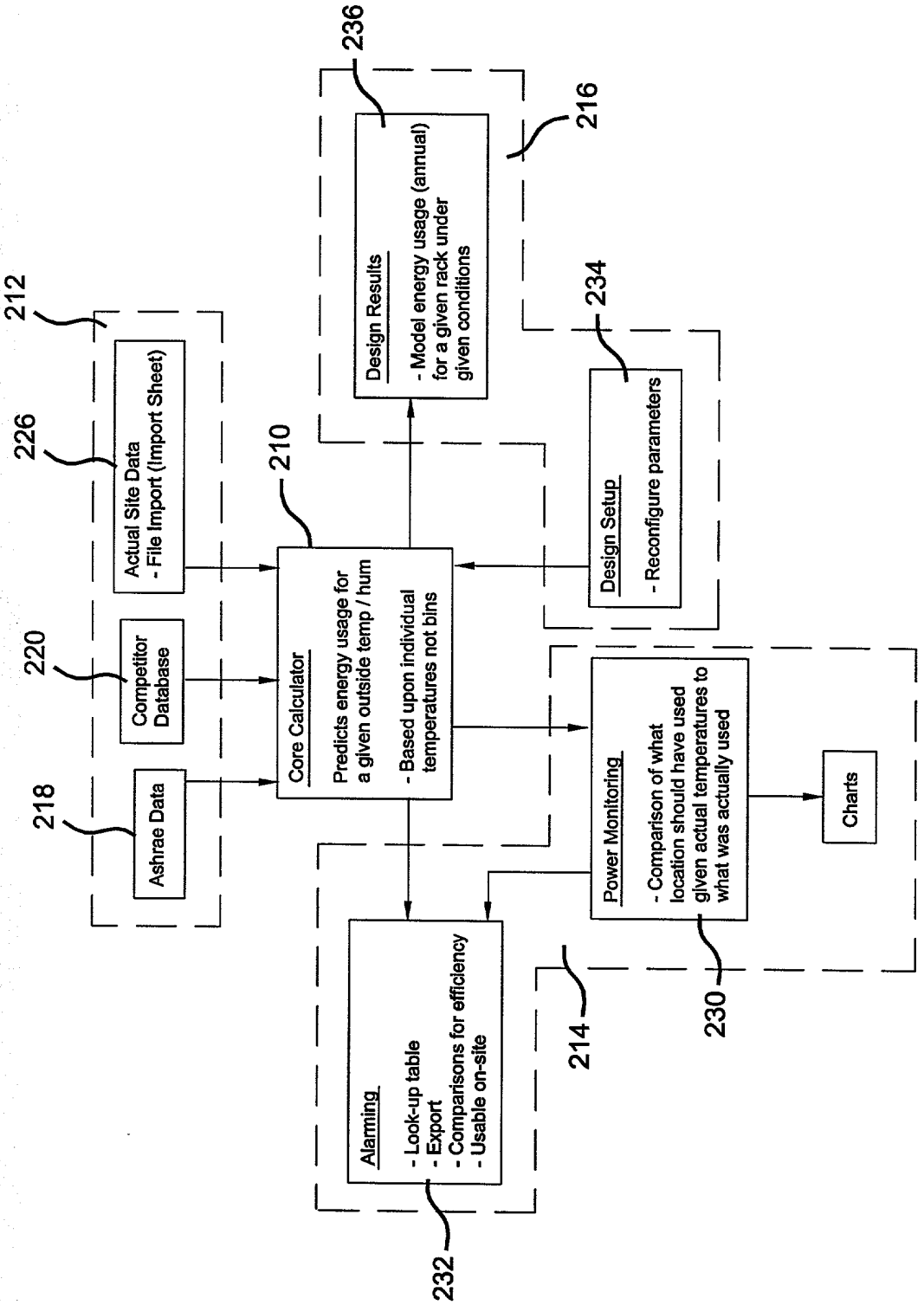

212
226
220
218
210
236
216
234
214
230
232
Actual Site Data
- File Import (Import Sheet)
Competitor Database
Ashrae Data
Core Calculator
Predicts energy usage for a given outside temp / hum
- Based upon individual temperatures not bins
Design Results
- Model energy usage (annual) for a given rack under given conditions
Design Setup
- Reconfigure parameters
Power Monitoring
- Comparison of what location should have used given actual temperatures to what was actually used
Charts
Alarming
- Look-up table
- Export
- Comparisons for efficiency
- Usable on-site

Figure 10

Ashrae Data for 72 Cities in Degrees F **WORKING PAGE, DO NOT CHANGE**

typical year through 1998

Each bin range extends from the temperature shown to the bottom of the next higher range. The bottom and top bins are open ended eg. 126.5 to 99999

# bins	24	ABEDMNTW.WY2		ALBIRMNW.WY2		ARLROCKW.WY2		AZPHNIXT.WY2		AZPHNIXW.WY2		BCVANCVW.WY2		CAFRESNT.WY2	
bin size	7F	(Edmonton, Alberta)		(Birminghai Alabama)		(Little Rock,		(Phoenix, Arizona)		(Phoenix, Arizona)		(Vancouver British		(Fresno, California)	
top range	127F	53.55		33.57 -86.75		34.73 -92.23		33.43 -112.02		33.43 -112.02		49.2 -123.18		36.77 -119.72	
Month	Bin Temp	DryBulb	WetBulb	DryBulb	WetBulb	DryBulb	WetBulb	DryBulb	WetBulb	DryBulb	WetBulb	DryBulb	WetBulb	DryBulb	WetBulb
Jan	126	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Jan	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	100	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Jan	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	74	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Jan	68	0	0	0	0	4	0	27	1	45	0	0	0	0	0
Jan	61	0	10	37	17	51	16	113	4	108	5	0	2	1	5
Jan	55	0	45	115	57	71	63	178	17	134	4	0	0	47	0
Jan	48	0	114	148	82	52	46	160	151	131	95	52	16	103	14
Jan	42	0	149	133	154	142	86	145	304	213	317	208	122	304	288
Jan	35	8	134	107	143	126	154	92	202	71	198	161	219	196	323
Jan	29	24	79	78	117	108	137	29	61	25	82	135	120	84	99
Jan	22	85	121	82	112	100	113	0	1	14	34	153	186	9	15
Jan	16	70	52	37	54	64	89	0	0	0	6	35	78	0	0
Jan	9	69	39	7	8	26	33	0	1	0	0	0	1	0	0
Jan	3	72	1	0	0	0	7	0	0	0	0	0	0	0	0
Jan	-4	84	0	0	0	0	0	0	1	0	1	0	0	0	0
Jan	-10	184	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	-17	63	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan	-99999	85	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	126	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Feb	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	81	0	0	0	0	0	0	2	0	3	0	0	0	0	0
Feb	74	0	1	4	0	0	0	13	0	8	1	0	0	1	0
Feb	68	0	0	19	0	15	3	52	2	65	0	0	0	10	0
Feb	61	0	4	92	71	33	13	105	1	91	1	0	1	41	1
Feb	55	0	71	106	73	54	33	141	6	166	88	0	0	108	42
Feb	48	0	77	90	53	89	72	130	115	152	169	18	1	224	185
Feb	42	0	156	125	130	206	139	156	294	152	246	313	167	170	275
Feb	35	22	99	73	122	104	179	68	201	28	152	244	376	74	105
Feb	29	73	101	99	100	101	121	5	47	7	15	92	122	44	58

Figure 11

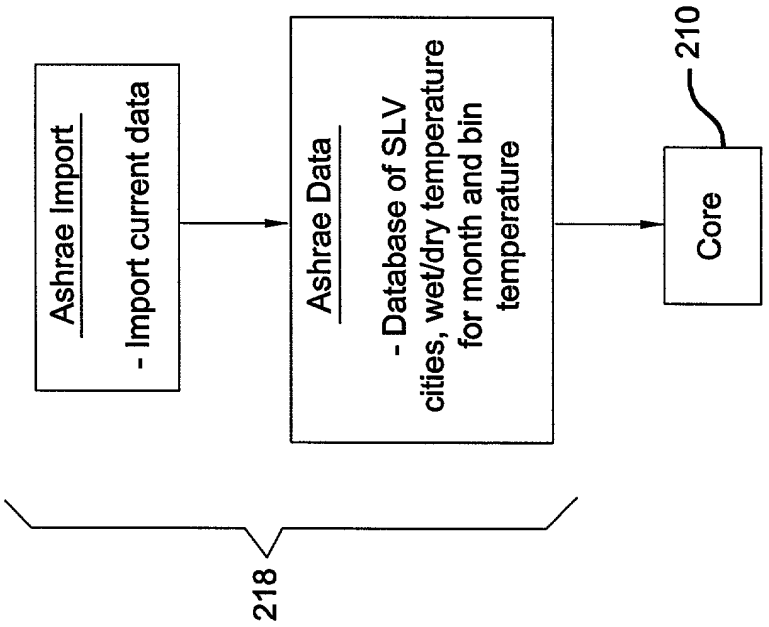

Ashrae Import
- Import current data
Ashrae Data
- Database of SLV cities, wet/dry temperature for month and bin temperature
Core
210
218

Figure 12

DO NOT CHANGE.... THIS PAGE IS POSITION DEPENDENT AND USED TO IMPORT NEW ASHRAE DATA !!!!

WYEC-2 site NMALBUQW.WY2 (Albuquerque, New Mexico)
Latitude: 35.05 Longitude: -106.62

quantity	WYEC2	wetbulb																						
0	0	0	0	2	22	80	248	270	120	2	0	0	0	0	0	0	0	0	0	0	0	0	0	744
0	0	0	0	0	43	42	116	156	204	99	9	0	3	0	0	0	0	0	0	0	0	0	0	672
0	0	0	0	3	0	14	143	232	255	96	0	0	1	0	0	0	0	0	0	0	0	0	0	744
3	0	0	1	0	2	2	41	115	228	232	83	10	1	0	0	0	0	0	0	2	0	0	0	720
5	0	0	2	0	0	0	1	21	89	283	263	71	6	0	1	1	0	0	0	1	0	0	0	744
1	0	0	2	0	0	0	0	5	23	134	199	268	81	0	2	1	0	0	0	2	0	0	2	720
0	0	0	0	0	0	0	4	0	0	6	12	382	318	19	0	2	1	0	0	0	0	0	0	744
0	0	0	0	0	0	0	1	1	2	20	82	280	343	14	0	0	0	0	0	1	0	0	0	744
1	0	0	2	0	0	0	1	4	13	158	218	300	20	0	1	0	0	0	0	0	0	0	2	720
0	0	0	0	0	0	0	1	4	89	276	265	103	6	0	0	0	0	0	0	0	0	0	0	744
2	0	0	2	1	7	37	147	198	172	141	12	0	1	0	0	0	0	0	0	0	0	0	0	720
0	0	0	0	3	28	62	210	195	209	37	0	0	0	0	0	0	0	0	0	0	0	0	0	744
12	0	0	9	9	102	237	913	1201	1404	1484	1143	1414	780	33	4	4	1	0	0	6	0	0	4	8760

Figure 13

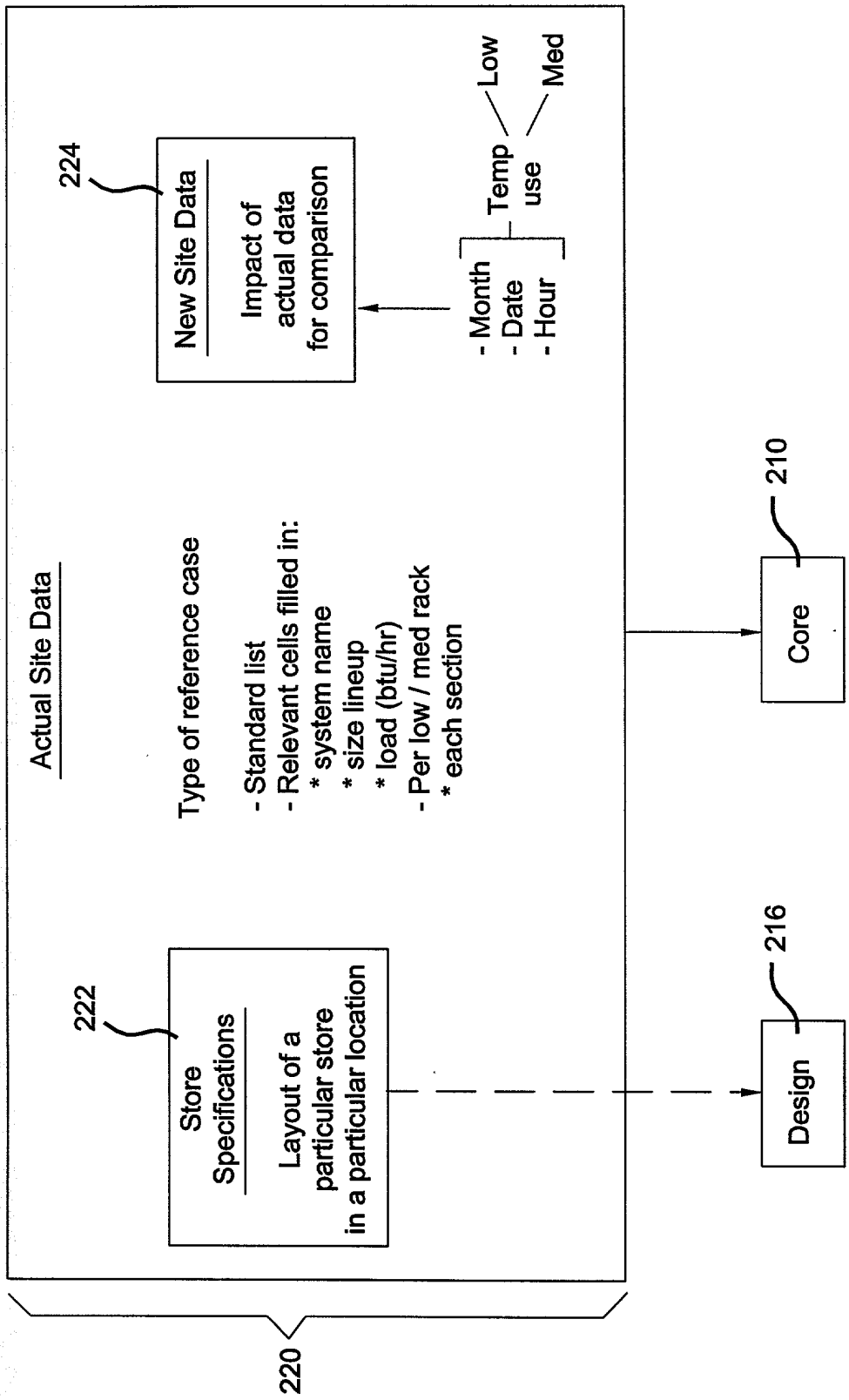

220
Actual Site Data
222
Store Specifications
Layout of a particular store in a particular location
Type of reference case
- Standard list
- Relevant cells filled in:
* system name
* size lineup
* load (btu/hr)
- Per low / med rack
* each section
224
New Site Data
Impact of actual data for comparison
- Month
- Date
- Hour
Temp
use
Low
Med
216
Design
210
Core

Figure 14

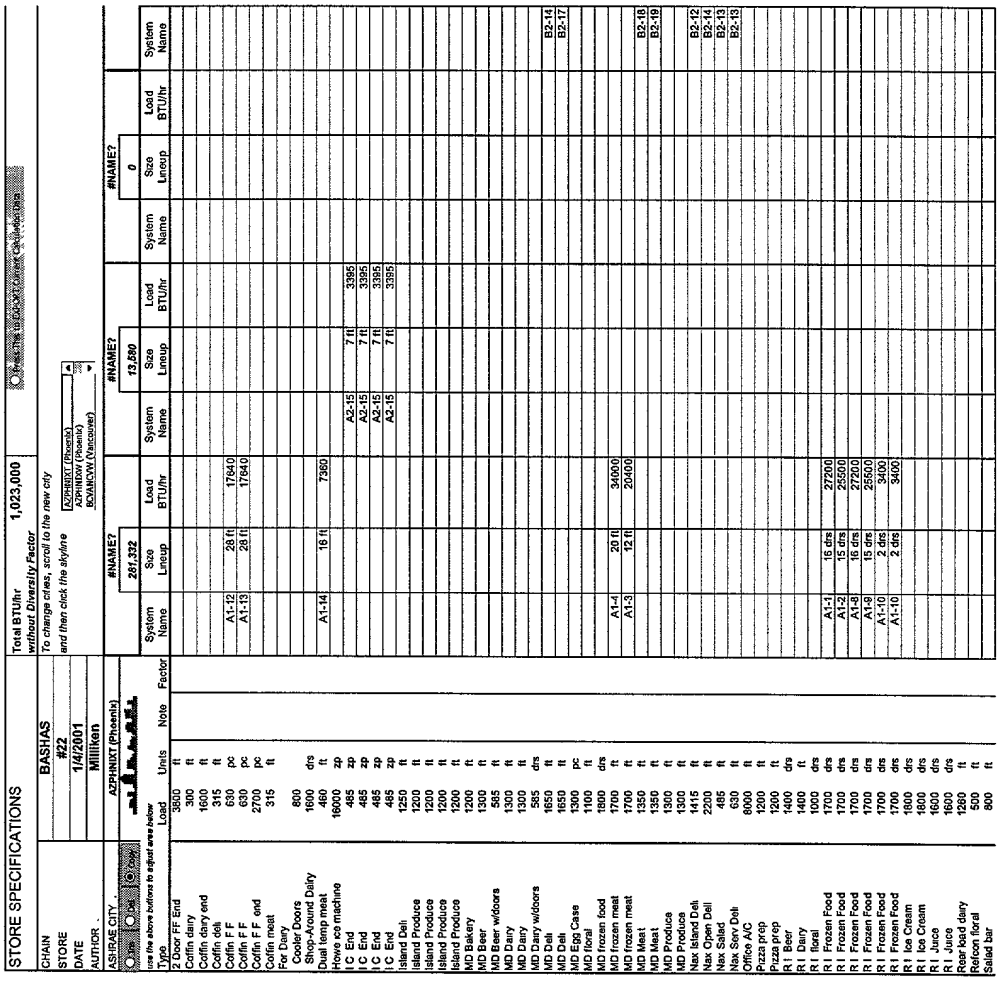

STORE SPECIFICATIONS
Total BTU/hr without Diversity Factor
1,023,000
CHAIN
BASHAS
STORE
#22
DATE
1/4/2001
AUTHOR
Milliken
To change cities, scroll to the new city
and then click the skyline
AZPHNIXT (Phoenix)
AZPHINDX (Phoenix)
BCVANCVW (Vancouver)
ASHRAE CITY
AZPHNIXT (Phoenix)
Use the above buttons to adjust area below
Type
Load
Units
Note
Factor
System Name
Size Lineup
Load BTU/hr
2 Door FF End
Coffin dairy
Coffin dairy end
Coffin deli
Coffin F F
Coffin F F end
Coffin meat
Fat Dairy
Glass Doors
Glass Doors Shoot Around Dairy
Dual temp meat
Howe ice machine
I C End
I C End
I C End
I C End
Island Deli
Island Produce
Island Produce
Island Produce
MD Bakery
MD Beer
MD Beer widoors
MD Dairy
MD Dairy
MD Dairy widoors
MD Deli
MD Deli
MD Egg Case
MD floral
MD frozen food
MD frozen meat
MD frozen meat
MD Meat
MD Meat
MD Produce
MD Produce
Nax Island Deli
Nax Open Deli
Nax Salad
Nax Serv Deli
Office A/C
Pizza prep
Pizza prep
R1 Beer
R1 Dairy
R1 floral
R1 Frozen Food
R1 Frozen Food
R1 Frozen Food
R1 Frozen Food
R1 Frozen Food
R1 Ice Cream
R1 Ice Cream
R1 Juice
R1 Juice
Rear load dairy
Refcon floral
Salad bar
#NAME?
291,332
#NAME?
13,280
#NAME?
0
A1-14
16 ft
7360
A2-15
7 ft
3395
A1-12
28 ft
17640
A1-13
28 ft
17640
A1-4
20 ft
34000
A1-3
12 ft
20400
A1-1
16 drs
27200
A1-2
15 drs
25500
A1-8
16 drs
27200
A1-9
15 drs
25500
A1-10
2 drs
3400
A1-10
2 drs
3400
B2-14
B2-17
B2-12
B2-14
B2-13
B2-13
B2-16
B2-19

Figure 15

DO NOT CHANGE... USED FOR ACTUAL DATA ... may be position dependent ACTUAL DAY BY DAY, HOUR BY HOUR DATA Data must be sorted by date and hour							ACTUAL DAY BY DAY,HOUR BY HOUR DATA FOR 24 HOUR PERIOD					
kwmonth	kwdate	kwhour	temp	kwuselt	kwusemt	Storepop	kwdate	kwhour	temp	kwuselt	kwusemt	Storepop
1	01/18/01	1.0	44.8	40.8	43.0	2.0	1/18/01	1	39	39	43	2
1	01/18/01	2.0	44.8	40.8	43.0	2.0	1/18/01	2	39	39	43	2
1	01/18/01	3.0	44.8	40.8	43.0	2.0	1/18/01	3	39	39	43	2
1	01/18/01	4.0	44.8	40.8	43.0	2.0	1/18/01	4	39	39	43	2
1	01/18/01	5.0	44.8	40.8	43.0	2.0	1/18/01	5	39	39	43	2
1	01/18/01	6.0	44.8	40.8	43.0	2.0	1/18/01	6	39	39	43	2
1	01/18/01	7.0	44.8	40.8	43.0	2.0	1/18/01	7	39	39	43	2
1	01/18/01	8.0	44.8	40.8	43.0	2.0	1/18/01	8	39	39	43	2
1	01/18/01	9.0	44.8	40.8	43.0	2.0	1/18/01	9	39	39	43	2
1	01/18/01	10.0	44.8	40.8	43.0	2.0	1/18/01	10	39	39	43	2
1	01/18/01	11.0	44.8	40.8	43.0	2.0	1/18/01	11	39	39	43	2
1	01/18/01	12.0	44.8	40.8	43.0	2.0	1/18/01	12	39	39	43	2
1	01/18/01	13.0	44.8	40.8	43.0	2.0	1/18/01	13	39	39	43	2
1	01/18/01	14.0	44.8	40.8	43.0	2.0	1/18/01	14	39	39	43	2
1	01/18/01	15.0	44.8	40.8	43.0	2.0	1/18/01	15	39	39	43	2
1	01/18/01	16.0	44.8	40.8	43.0	2.0	1/18/01	16	39	39	43	2
1	01/18/01	17.0	44.8	40.8	43.0	2.0	1/18/01	17	39	39	43	2
1	01/18/01	18.0	44.8	40.8	43.0	2.0	1/18/01	18	39	39	43	2
1	01/18/01	19.0	44.8	40.8	43.0	2.0	1/18/01	19	39	39	43	2
1	01/18/01	20.0	44.8	40.8	43.0	2.0	1/18/01	20	39	39	43	2
1	01/18/01	21.0	44.8	40.8	43.0	2.0	1/18/01	21	39	39	43	2
1	01/18/01	22.0	44.8	40.8	43.0	2.0	1/18/01	22	39	39	43	2
1	01/18/01	23.0	44.8	40.8	43.0	2.0	1/18/01	23	39	39	43	2
1	01/18/01	0.0	44.8	40.8	43.0	2.0	1/19/01	0	39	16	42	2

Figure 16

GENERAL MODEL CALCULATIONS

LOW and MEDIUM TEMP RACK kWh Use for Each Bin Hour

				Suct T..... -25F			Suct T..... -35F			Suct T..... 15F			Total	Condenser Calculations			Annual Energy		
				Base Load..... 281,332			Base Load..... 13,580			Base Load..... -			Comp	Heat of	req.	fan	Comp	Cond	Total
Amb	Cond T	Subcooler T		Comp Eff..... 65%			Comp Eff..... 65%			Comp Eff..... 65%			KW	Rejection	cap.	KW	kWh	kWh	kWh
Temp	Temp	Tin	Tout	s.c. load	comp load	Comp KW	s c. load	comp load	Comp KW	s.c. load	comp load	Comp KW		(Btu/hr)					
-25	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	27%	0.35	29	0.35	30
-24	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	28%	0.35	29	0.35	30
-23	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	28%	0.35	29	0.35	30
-22	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	28%	0.36	29	0.36	30
-21	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	29%	0.36	29	0.36	30
-20	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	29%	0.37	29	0.37	30
-19	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	29%	0.37	29	0.37	30
-18	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	30%	0.38	29	0.38	30
-17	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	30%	0.38	29	0.38	30
-16	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	31%	0.39	29	0.39	30
-15	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	31%	0.39	29	0.39	30
-14	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	32%	0.40	29	0.40	30
-13	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	32%	0.41	29	0.41	30
-12	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	32%	0.41	29	0.41	30
-11	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	33%	0.42	29	0.42	30
-10	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	33%	0.42	29	0.42	30
-9	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	34%	0.43	29	0.43	30
-8	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	35%	0.44	29	0.44	30
-7	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	35%	0.45	29	0.45	30
-6	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	36%	0.45	29	0.45	30
-5	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	36%	0.46	29	0.46	30
-4	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	37%	0.47	29	0.47	30
-3	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	37%	0.48	29	0.48	30
-2	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	38%	0.48	29	0.48	30
-1	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	39%	0.49	29	0.49	30
0	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	40%	0.50	29	0.50	30
1	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	40%	0.51	29	0.51	30
2	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	41%	0.52	29	0.52	30
3	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	42%	0.53	29	0.53	30
4	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	43%	0.54	29	0.54	30
5	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1 58	-	-	-	29.34	395,006	43%	0.55	29	0.55	30
6	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	44%	0.56	29	0.56	30
7	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	45%	0.57	29	0.57	30
8	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	46%	0.59	29	0.59	30
9	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	47%	0.60	29	0.60	30
10	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	48%	0.61	29	0.61	30
11	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	49%	0.63	29	0.63	30
12	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	50%	0.64	29	0.64	30
13	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	52%	0.65	29	0.65	30
14	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	53%	0.67	29	0.67	30
15	55.5285	40.5	40.5	-	281,332	27.76	-	13,580	1.58	-	-	-	29.34	395,006	54%	0.69	29	0.69	30

Figure 17

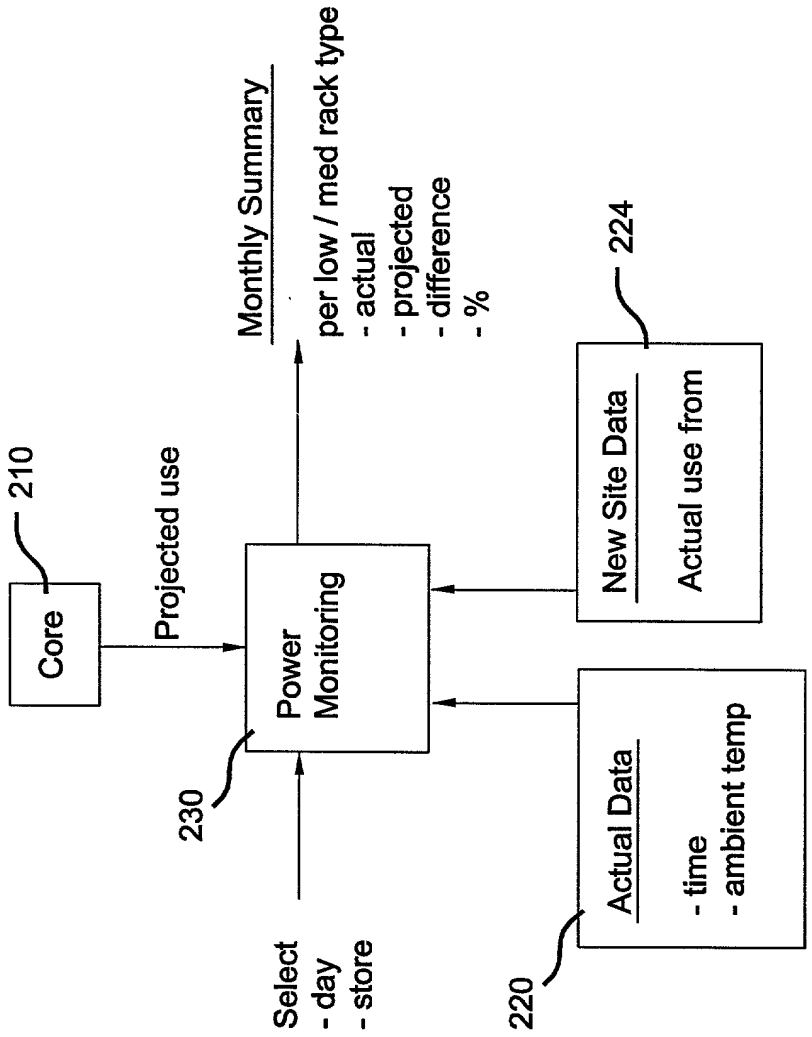

Monthly Summary
per low / med rack type
- actual
- projected
- difference
- %
210
Core
Projected use
Power Monitoring
230
224
New Site Data
Actual use from
Actual Data
- time
- ambient temp
220
Select
- day
- store

Figure 18

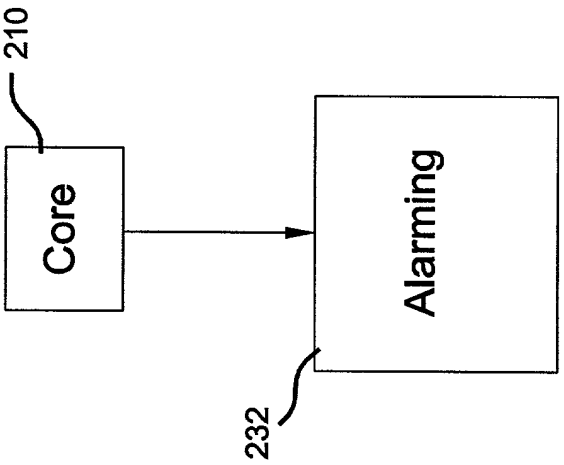


Figure 19

POWER MONITORING TOOL actual versus projected use

Enter Beginning Day and Hour fo start 24 hour summary
Monthly data will begin on the specified date and run for 31 days
Yearly data will be accumulated by actual month

STORE NAME
Beginning Day
Beginning Hour (0-23)
Date Index ... calculated, do not enter

Click to Update Date and Time

Comparison Charts available on next page

#22 - MONTHLY SUMMARY	
LOW TEMP RACK	
Actual kWh Use	14,938
Projected kWh Use	12,463
Difference	2,475
% Over/Under(-) Proj	19 9%
MEDIUM TEMP RACK	
Actual kWh Use	15,840
Projected kWh Use	9,682
Difference	6,158
% Over/Under(-) Proj	63 6%
BOTH LOW AND MEDIUM	
Actual kWh Use	30,778
Projected kWh Use	22,145
Difference	8,633
% Over/Under(-) Proj	39 0%

ACTUAL HOURLY DATA for selected day

									COMPARISON							
			Low Temp Rack	Medium Temp Rack	Total	Low Temp Rack	Medium Temp Rack	Total	Low Temp Rack		Medium Temp Rack		Hrly Total		Running Tot	
Time of Day	Ambient Temp	Occupancy Factor	Total kWh	Total kWh	Total kWh	Total kWh	Total kWh	Total kWh	Over Est kWh		Over Est kWh		Over Est kWh		Over Est kWh	
1	45		33.825	25.120	58.945	40 381	41.500	81 881	6 556	19 4%	16 380	65 2%	22.936	38 9%	22 936	38 9%
2	44		33.334	24.450	57.784	40 769	43.000	83.769	7.435	22 3%	18.550	75.9%	25.985	45 0%	48 921	41 9%
3	44		33.334	24 450	57.784	40.769	43.000	83 769	7.435	22 3%	18.550	75.9%	25.985	45.0%	74 906	42 9%
4	44		33.334	24 450	57.784	40 769	43 000	83.769	7.435	22.3%	18.550	75 9%	25.985	45.0%	100.89	43 4%
5	44		33.334	24.450	57.784	40.769	43 000	83.769	7.435	22 3%	18.550	75.9%	25.985	45.0%	126.875	43.7%
6	44		33 334	24 450	57.784	40 769	43 000	83.769	7.435	22.3%	18.550	75 9%	25.985	45.0%	152.86	43.9%
7	44		33.334	24 450	57.784	40 769	43.000	83 769	7.435	22.3%	18 550	75.9%	25.985	45.0%	178.844	44.1%
8	44		33 334	24 450	57 784	40 769	43 000	83 769	7.435	22 3%	18.550	75 9%	25.985	45.0%	204.829	44.2%
9	44		33 334	24.450	57 784	40.769	43 000	83 769	7 435	22 3%	18.550	75 9%	25.985	45.0%	230.814	44.3%
10	44		33.334	24.450	57.784	40.769	43.000	83 769	7.435	22 3%	18.550	75 9%	25.985	45 0%	256.798	44.4%
11	44		33.334	24.450	57.784	40.769	43 000	83 769	7.435	22 3%	18 550	75.9%	25.985	45.0%	282.783	44.4%
12	44		33.334	24.450	57.784	40 769	43.000	83 769	7.435	22.3%	18.550	75.9%	25.985	45 0%	308.767	44.5%
13	44		33.334	24.450	57 784	40 769	43.000	83 769	7 435	22.3%	18 550	75 9%	25.985	45.0%	334.752	44.5%
14	44		33.334	24.450	57 784	40 769	43 000	83.769	7 435	22 3%	18 550	75 9%	25.985	45.0%	360.737	44.5%
15	44		33.334	24.450	57.784	40 769	43 000	83.769	7 435	22 3%	18.550	75 9%	25.985	45.0%	386 721	44.6%
16	44		33.334	24.450	57.784	40 769	43.000	83 769	7 435	22 3%	18.550	75.9%	25 985	45.0%	412.706	44.6%
17	44		33.334	24.450	57.784	40 769	43.000	83 769	7 435	22.3%	18 550	75 9%	25.985	45.0%	438.691	44.6%
18	44		33.334	24 450	57.784	40 769	43.000	83 769	7 435	22.3%	18.550	75 9%	25 985	45.0%	464.675	44.6%
19	44		33.334	24.450	57.784	40 769	43 000	83.769	7.435	122.3%	19.550	75.9%	25.985	45 0%	490.66	44.6%

Figure 20

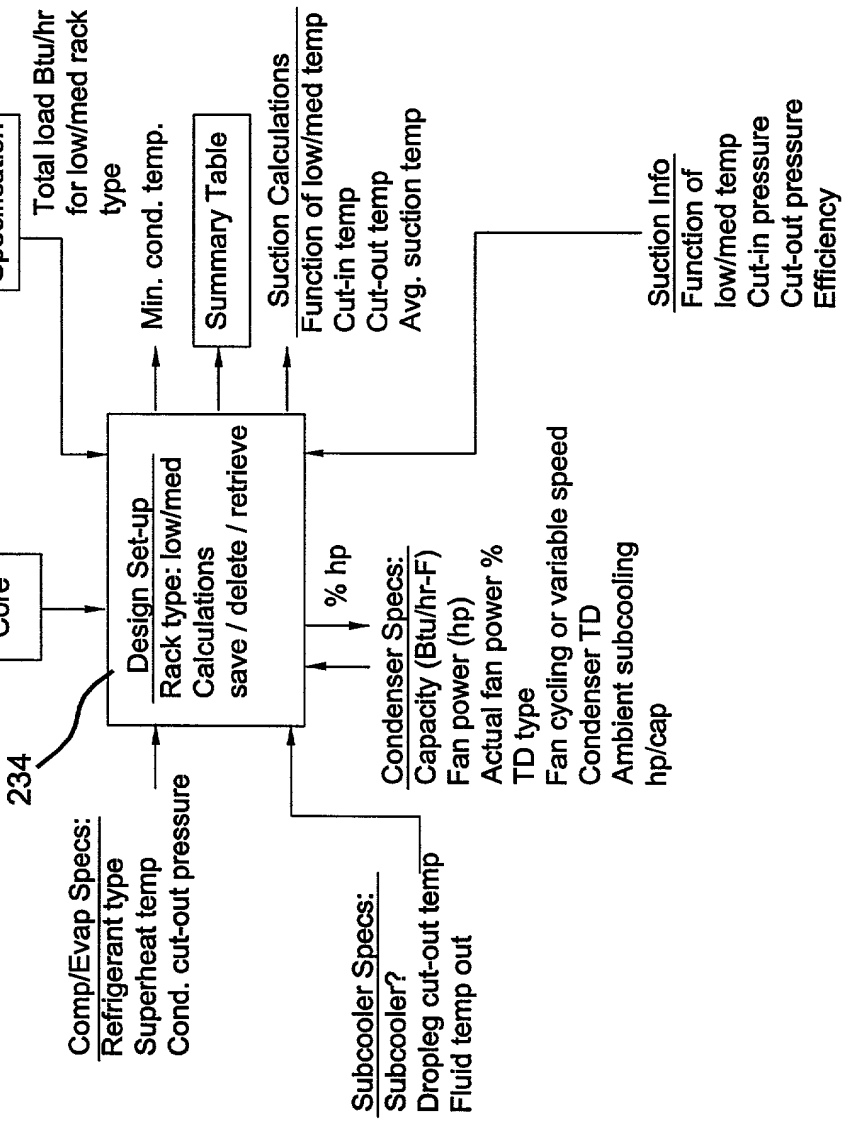

222
Store Specification
Total load Btu/hr for low/med rack type
Min. cond. temp.
Summary Table
Suction Calculations
Function of low/med temp
Cut-in temp
Cut-out temp
Avg. suction temp
210
Core
Design Set-up
Rack type: low/med
Calculations
save / delete / retrieve
% hp
234
Comp/Evap Specs:
Refrigerant type
Superheat temp
Cond. cut-out pressure
Condenser Specs:
Capacity (Btu/hr-F)
Fan power (hp)
Actual fan power %
TD type
Fan cycling or variable speed
Condenser TD
Ambient subcooling
hp/cap
Subcooler Specs:
Subcooler?
Dropleg cut-out temp
Fluid temp out
Suction Info
Function of
low/med temp
Cut-in pressure
Cut-out pressure
Efficiency

Figure 21

DESIGN TOOL SETUP AZPHNIXT (Phoenix) STORE: #22 Period All

Select Scenario, Enter Specifications Below, and Save Scenario

#1 BASE CASE - - High cond temp -LT Rack 2/4/01 807,550 kW
#2 RETROFIT CAS - Rev Disch and Suct Press 2/4/01 769,018 k
#3 BASE CASE - - No Subcooler 3/10/01 1,125,150 kWh
#4 is available
#5 is available
#6 is available
#7 is available
#8 is available
#9 is available
#10 is available

(•) Save ( ) Delete ( ) Retrieve

CURRENT SCENARIO	
Scenario	**Retrofit Case**
Comment	**Rev Disch and Suct Press**
Date	**2/4/2001**
Scenario#	2
Period	All

Enter items in 'bold' above, before saving scenario

LOW to MEDIUM TEMP RACK

Comp/Evap. Spec.	
Refrigerant.....	R-507
Superheat.....	25F
Min. cond. temp.....	55.5F
Condenser cut-out:	120.0psig
Subcooler Characteristics	
Subcooler?	y
Dropleg cutout temp	50F
Fluid temp out	50F
Condenser Characteristics	
Capacity	18,000 Btu/hr-F
Fan Power	2 hp
Actual Fan Power	85%
Select TD type below	
fan cycling or variable speed	fan cycling
Condenser TD	20F
Amb. Subcooling	15F
hp/cap =	1/3 2/3
%hp = (%cap)^	2.71

Suction #1	-25F	Loads	Suction #2	-35F	Loads	Suction #3	15F	Loads
Cut-in:	14.0psig	-25.5F	Cut-in:	8.0psig	-35.3F	Cut-in:	52.0psig	14.8F
Cut-out:	14.0psig	-25.5F	Cut-out:	8.0psig	-35.3F	Cut-out:	52.0psig	14.8F
Avg suction		-25.5F	Avg suction		-35.3F	Avg suction		14.8F
Comp Eff		65%	Comp Eff		65%	Comp Eff		65%
Total design load.....		281,332	Total design load.....		13,580	Total design load.....		-
Diversity factor.....		100%	Diversity factor.....		100%	Diversity factor.....		85%
Actual load.....		281,332	Actual load.....		13,580	Actual load.....		-

RACKS	BTU/hr	Compr	Cond	Total
LowTemp	294,912	350,372	12,080	362,452
HghTemp	615,221	376,987	29,580	406,567
Total	**910,133**	**727,359**	**41,660**	**769,019**

taken from Design Tool Results

Figure 22

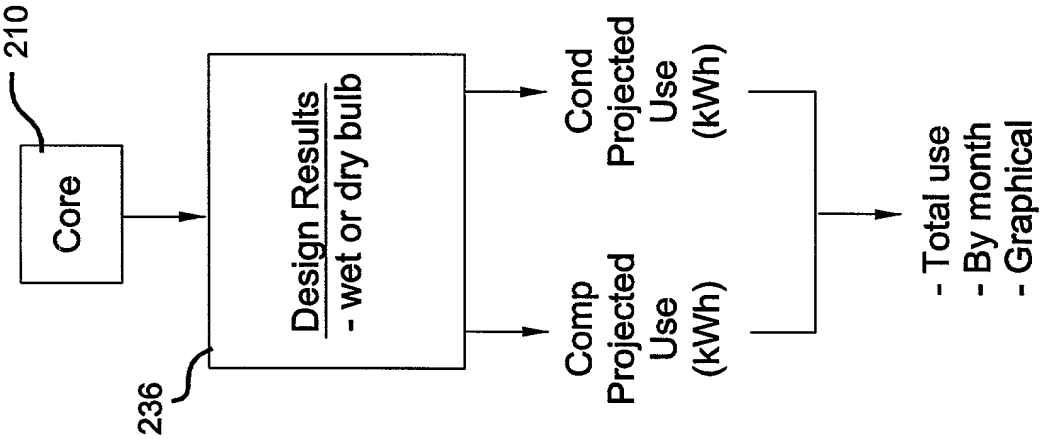
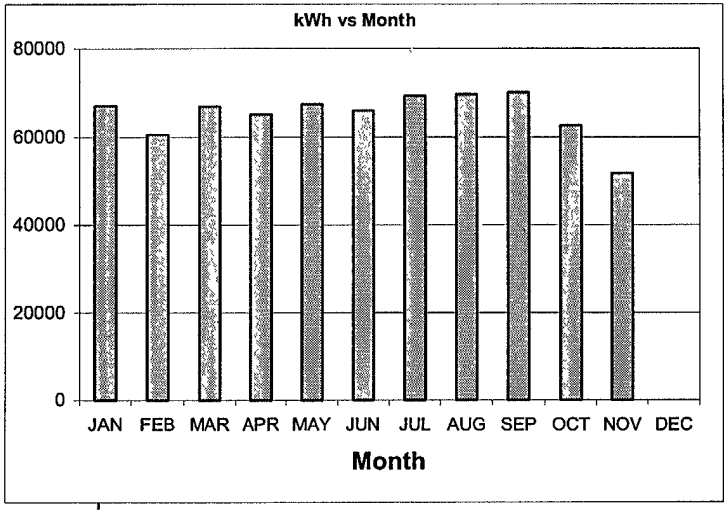

210
Core
236
Design Results
- wet or dry bulb
Cond Projected Use (kWh)
Comp Projected Use (kWh)
- Total use
- By month
- Graphical

Figure 23

DESIGN TOOL RESULTS projected kWh use for selected ASHRAE city AZPHNIXT (Phoenix)

Select Wet ○ *or Dry Bulb* ◉ Dry 2

Month	LowTUse	MedTUse	Total	AvgTemp
ALL	#NAME?	#NAME?	#NAME?	67.0F
JAN	29091	37953	67045	40
FEB	26222	34305	60527	40
MAR	28958	37994	66953	42
APR	28211	36859	65070	48
MAY	29180	38250	67430	52
JUN	28497	37447	65944	59
JUL	29754	39520	69275	66
AUG	29818	39888	69706	65
SEP	61607	8508	70115	81
OCT	55285	7323	62608	69
NOV	45805	5924	51730	57
DEC				



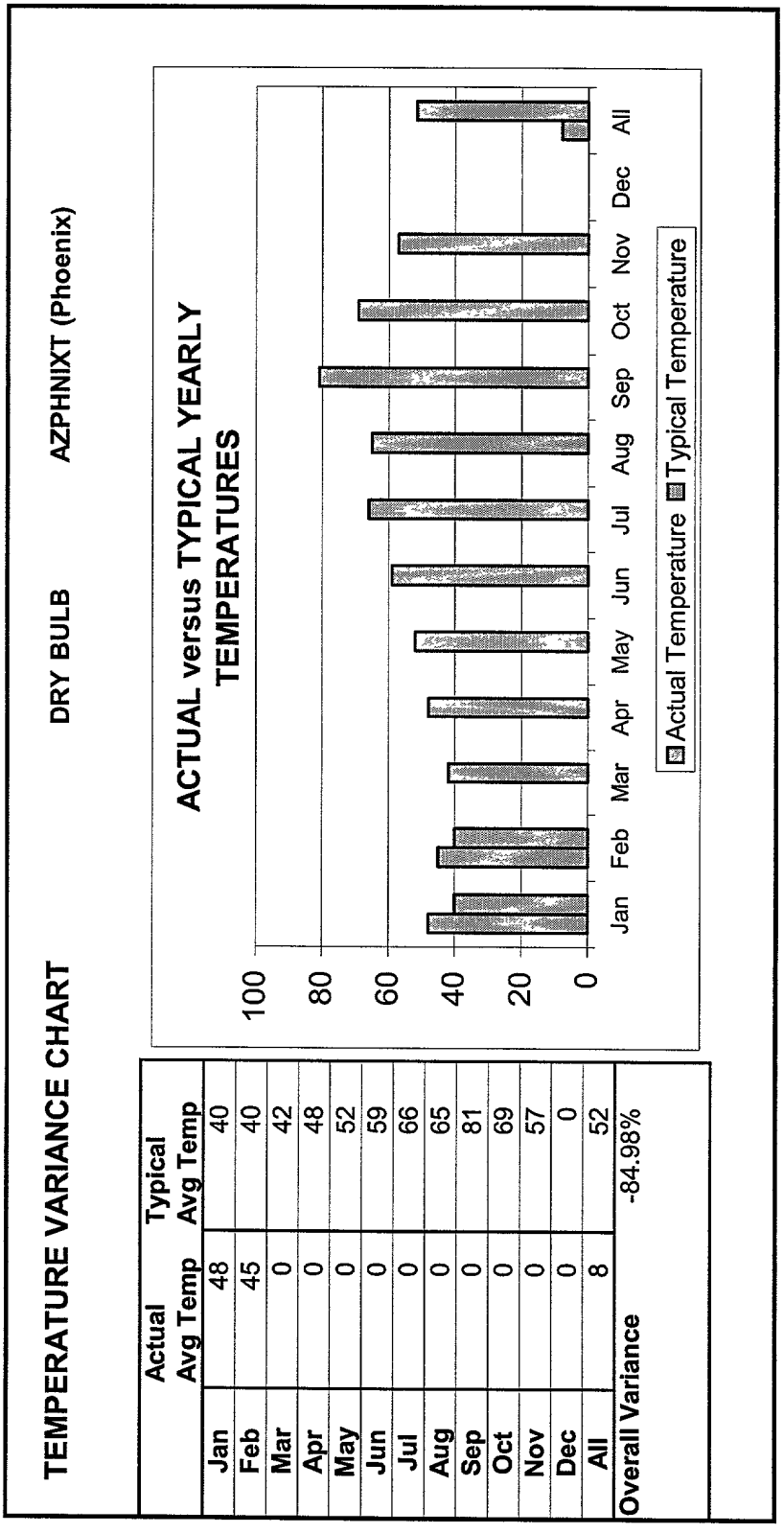
Projected Use Table

dec / all ▲▼ ○ Click to Update Month ○ Click to Clear Table

BIN TEMP LOOKUP TABLE for current model calculations | PROJECTED USE based on Degree Hours

BinTemp	Low Temp Rack Comp kWh	Low Temp Rack Cond kWh	Medium Temp Rack Comp kWh	Medium Temp Rack Cond kWh	Hours	Low Temp Rack Comp kWh	Low Temp Rack Cond kWh	Medium Temp Rack Comp kWh	Medium Temp Rack Cond kWh	Total Tot kWh
-25	29.336	0.346	18.565	0.588	-					-
-24	29.336	0.350	18.565	0.596	-					-
-23	29.336	0.354	24.778	0.623	-					-
-22	29.336	0.359	25.047	0.633	-					-
-21	29.336	0.364	25.322	0.643	-					-
-20	29.336	0.368	25.604	0.653	-					-
-19	29.336	0.373	25.894	0.664	-					-
-18	29.336	0.378	26.191	0.675	-					-
-17	29.336	0.384	26.496	0.687	-					-
-16	29.336	0.389	26.808	0.698	-					-
-15	29.336	0.395	27.129	0.710	-					-
-14	29.336	0.400	27.457	0.723	-					-

Figure 24



	Actual Avg Temp	Typical Avg Temp
Jan	48	40
Feb	45	40
Mar	0	42
Apr	0	48
May	0	52
Jun	0	59
Jul	0	66
Aug	0	65
Sep	0	81
Oct	0	69
Nov	0	57
Dec	0	0
All	8	52
Overall Variance		-84.98%

Figure 25

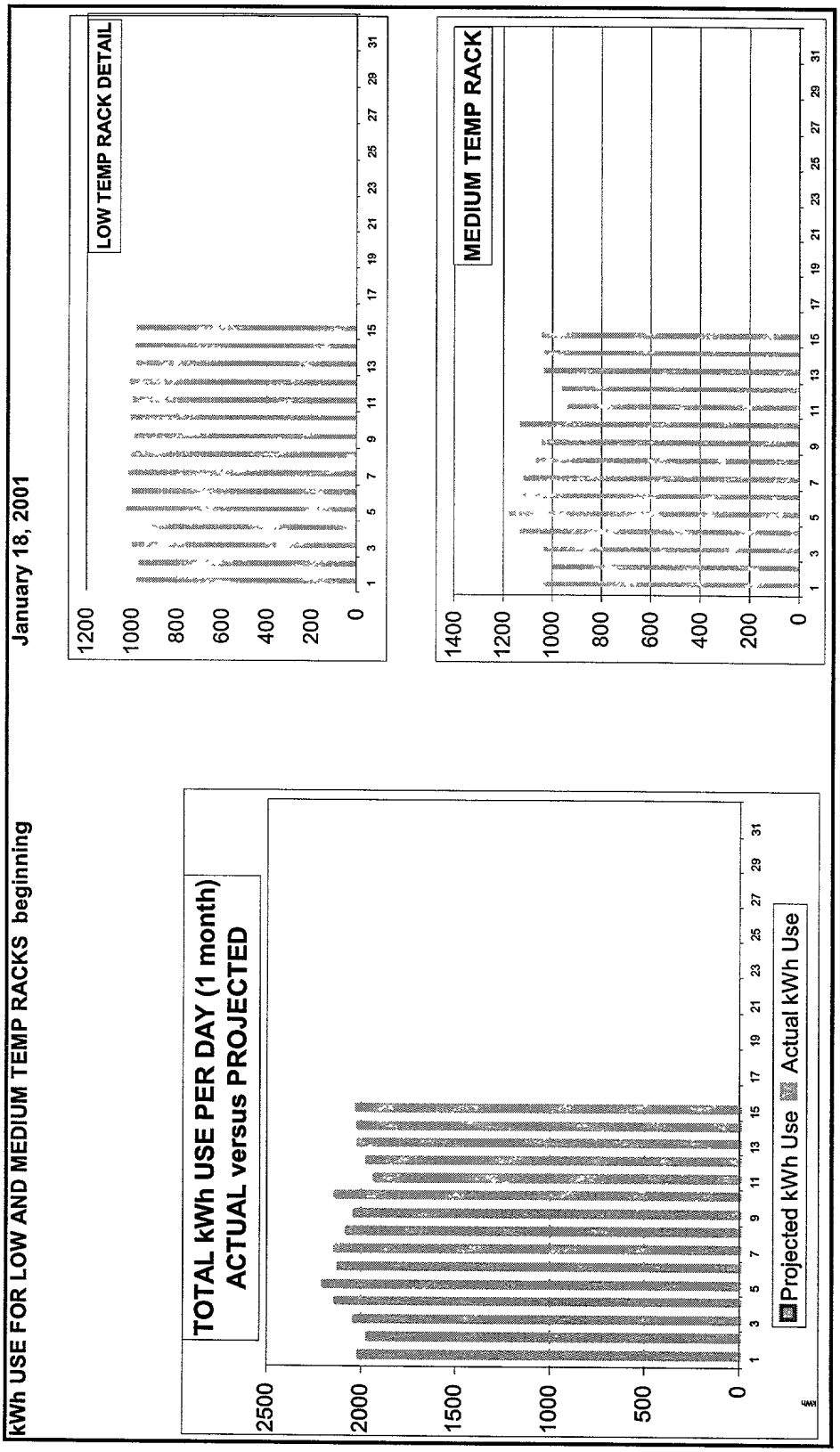

kWh USE FOR LOW AND MEDIUM TEMP RACKS beginning January 18, 2001
TOTAL kWh USE PER DAY (1 month)
ACTUAL versus PROJECTED
Projected kWh Use
Actual kWh Use
LOW TEMP RACK DETAIL
MEDIUM TEMP RACK

Figure 26

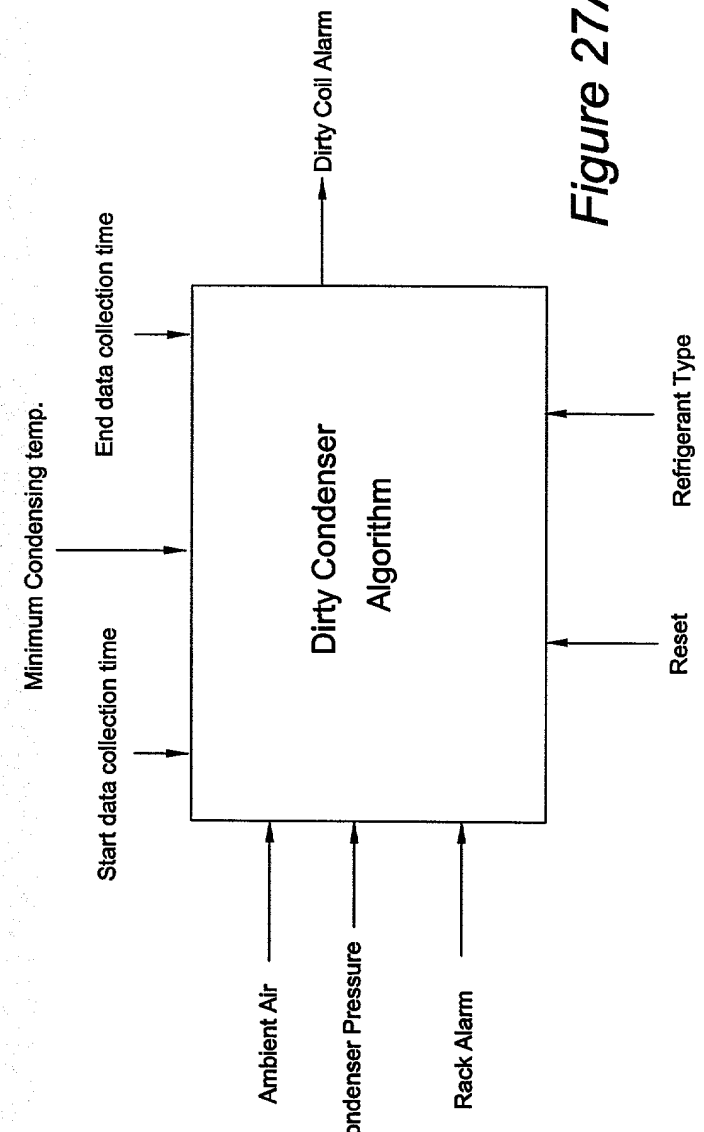


Figure 27A

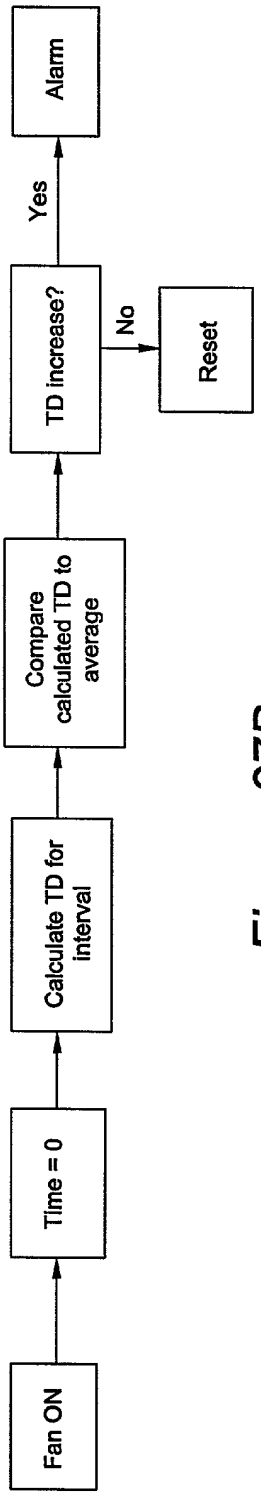


Figure 27B

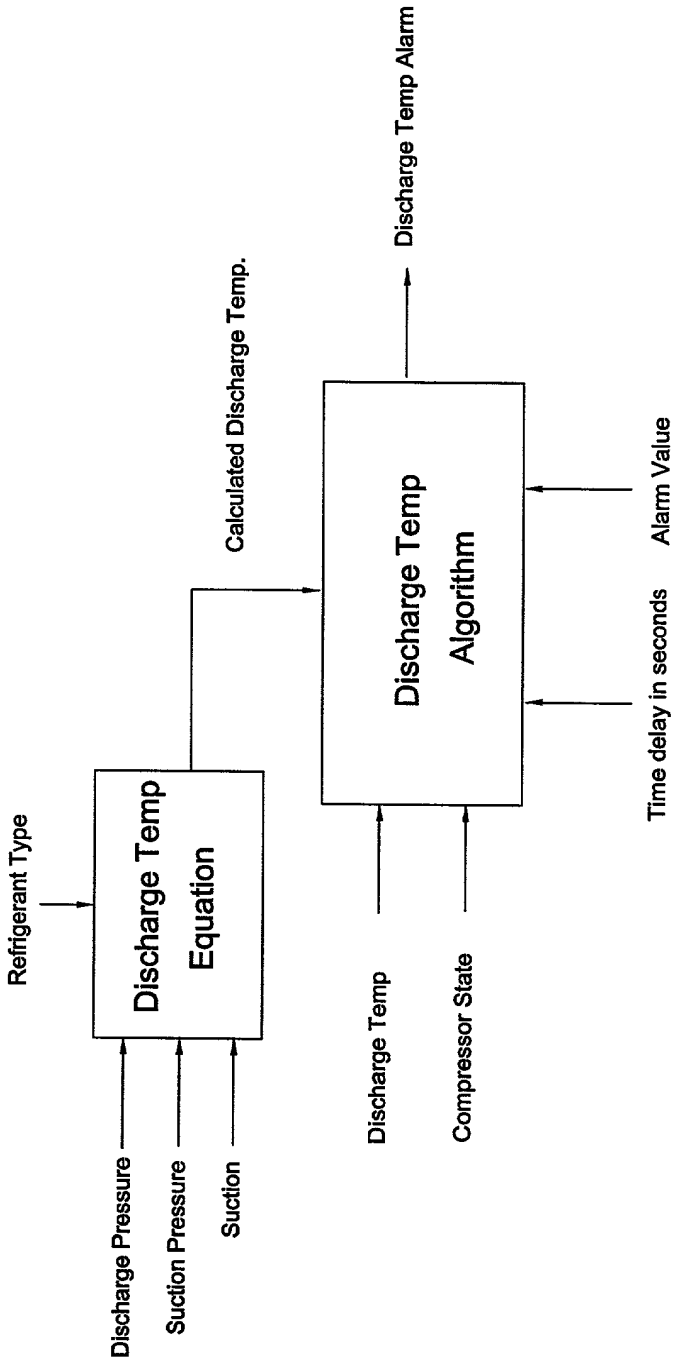

Refrigerant Type
Discharge Temp Equation
Discharge Pressure
Suction Pressure
Suction
Calculated Discharge Temp.
Discharge Temp
Compressor State
Discharge Temp Algorithm
Alarm Value
Time delay in seconds
Discharge Temp Alarm

Figure 28

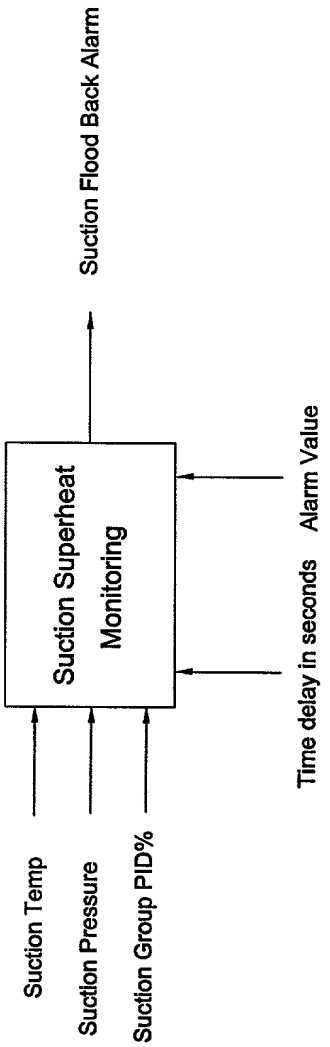


Figure 29A

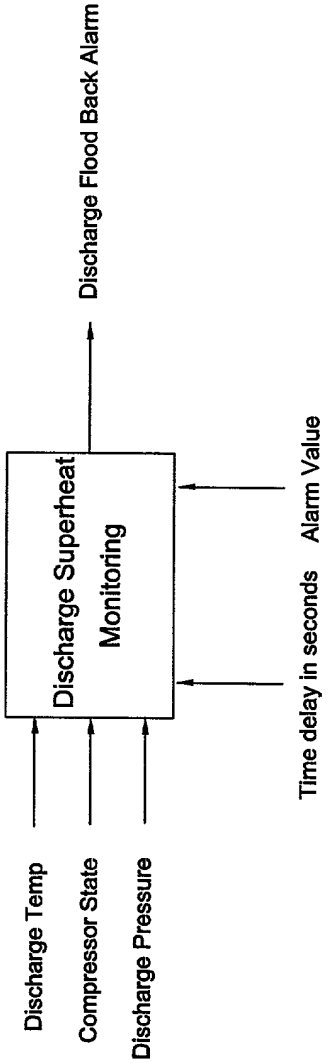


Figure 29B

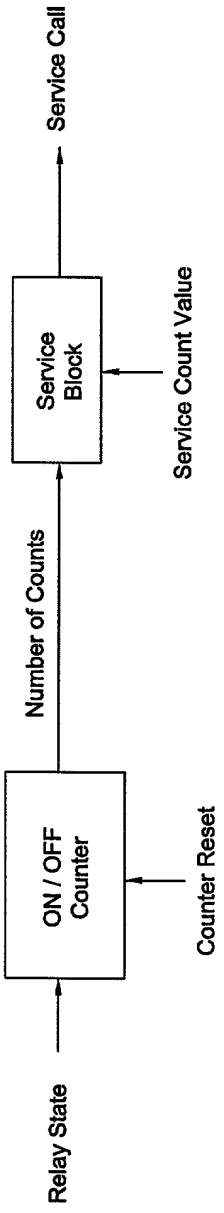

Service Call
Service Block
Service Count Value
Number of Counts
ON / OFF Counter
Counter Reset
Relay State

Figure 30

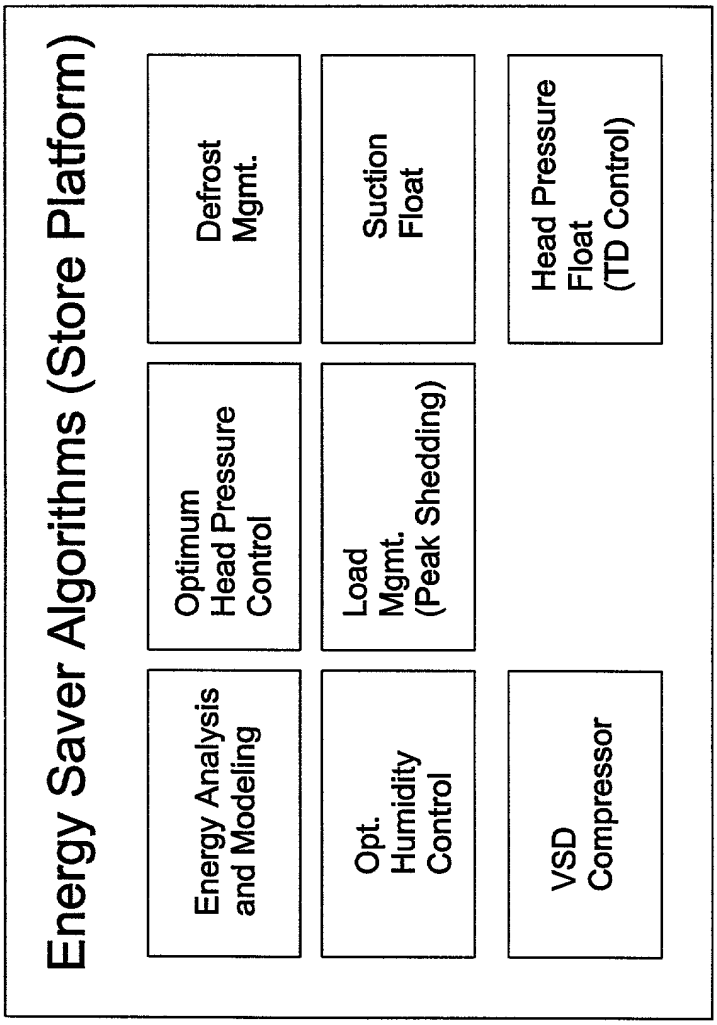

Energy Saver Algorithms (Store Platform)
Energy Analysis and Modeling
Optimum Head Pressure Control
Defrost Mgmt.
Opt. Humidity Control
Load Mgmt. (Peak Shedding)
Suction Float
VSD Compressor
Head Pressure Float (TD Control)

Figure 31

Disc. Air Temp. Sensor Failed	Prod. Temp. Sensor Failed	Disc. Air Time-Temp. Sensor Failed	Disc. Air Degree-Min Exceeded	Prod Time-Temp. Exceeded	Prod Degree-Min. Exceeded	Prod FDA Time-Temp Exceeded	Spoiler Count Exceeded	Pathogen Count Exceeded	Prod Temp. Cycling	Actions
X										Maintenance Advisory: Non-emergency repair
		X								Maintenace Advisory: Maintenace review remotely and respond as necessary
	X									Store Advisory: Store advised to manually check product temperatures, Maintenance Advisory: Non-emergency repair
X	X									Maintenance Alarm: Immediate action required. Store Advisory: advise manually check of product temperatures
								X		Maintenance Advisory: Review remotely and respond as necessary
				X	X					Store Advisory: Store advised to inspect / correct per procedures; Call maintenance if cannot resolve
						X				Store Alarm: Store must check product temperatures and condition; remove to other refrigerated storage as reqd.
							X			Store Alarm: Store must immediately inspect product in affected fixture; remove product per date code limits
									X	Store Emergency: Store must immediately remove and discard product per date code limits from affected fixture(s)

Figure 32

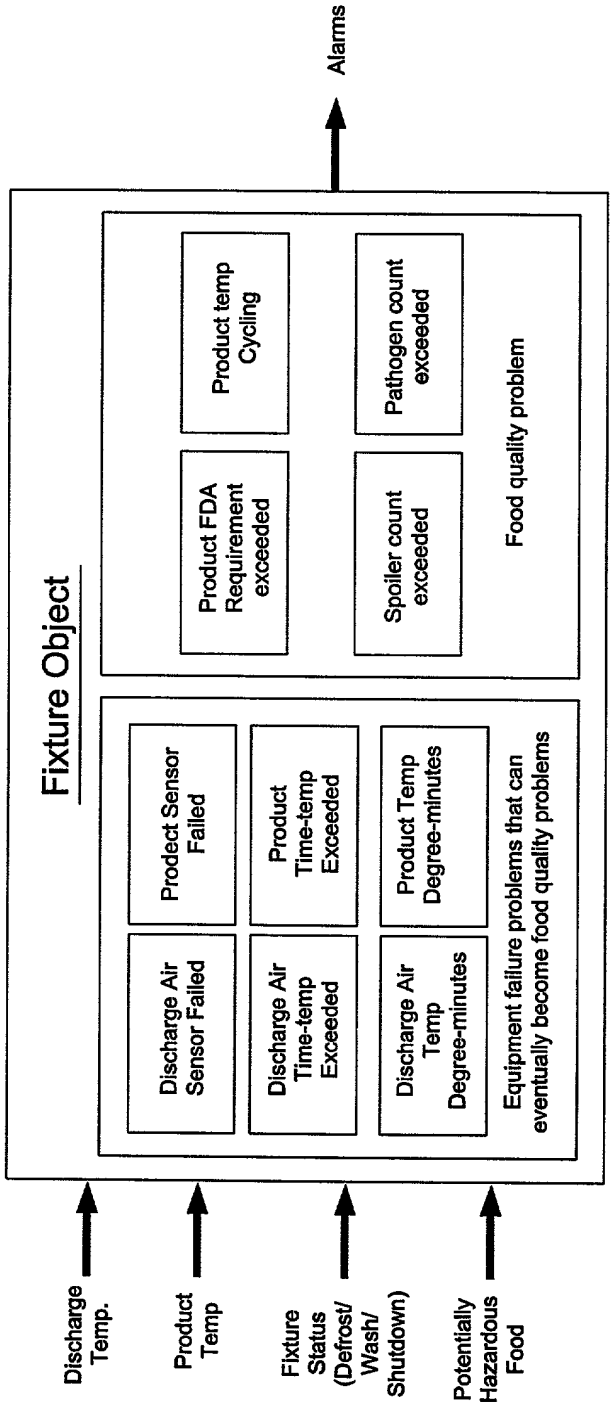

Alarms
Fixture Object
Food quality problem
Product FDA Requirement exceeded
Product temp Cycling
Spoiler count exceeded
Pathogen count exceeded
Discharge Air Sensor Failed
Prodect Sensor Failed
Discharge Air Time-temp Exceeded
Product Time-temp Exceeded
Discharge Air Temp Degree-minutes
Product Temp Degree-minutes
Equipment failure problems that can eventually become food quality problems
Discharge Temp.
Product Temp
Fixture Status (Defrost/ Wash/ Shutdown)
Potentially Hazardous Food

Figure 33

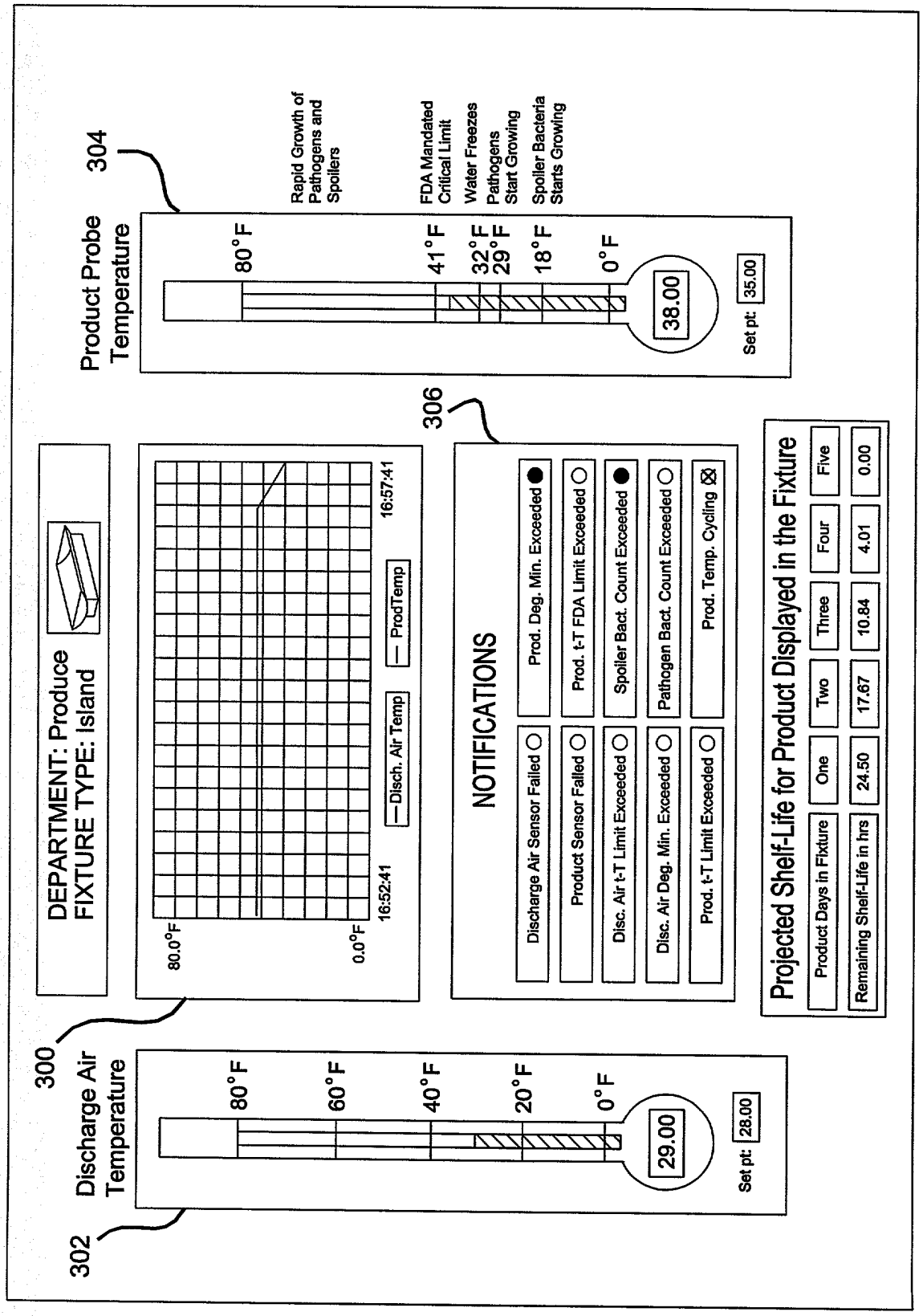

Product Probe Temperature
304
Rapid Growth of Pathogens and Spoilers
FDA Mandated Critical Limit
Water Freezes
Pathogens Start Growing
Spoiler Bacteria Starts Growing
80°F
41°F
32°F
29°F
18°F
0°F
38.00
Set pt: 35.00
306
DEPARTMENT: Produce
FIXTURE TYPE: Island
80.0°F
0.0°F
16:52:41
16:57:41
Disch. Air Temp
ProdTemp
NOTIFICATIONS
Discharge Air Sensor Failed
Prod. Deg. Min. Exceeded
Product Sensor Failed
Prod. t-T FDA Limit Exceeded
Disc. Air t-T Limit Exceeded
Spoiler Bact. Count Exceeded
Disc. Air Deg. Min. Exceeded
Pathogen Bact. Count Exceeded
Prod. t-T Limit Exceeded
Prod. Temp. Cycling
Projected Shelf-Life for Product Displayed in the Fixture
Product Days in Fixture
One
Two
Three
Four
Five
Remaining Shelf-Life in hrs
24.50
17.67
10.84
4.01
0.00
300
Discharge Air Temperature
80°F
60°F
40°F
20°F
0°F
29.00
Set pt: 28.00
302

Figure 34